CHAPTER 4
SOUTH DAKOTA and WYOMING

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CHAPTER 4
SOUTH DAKOTA and WYOMING

The following discusses the existing conditions and potential environmental impacts that could be anticipated to occur along the existing Dakota, Minnesota, and Eastern Railroad Corporation (DM&E) rail line due to the No-Action Alternative (Project Denial), the various Action Alternatives proposed to extend DM&E's existing rail line into the Powder River Basin (PRB), and proposed existing rail line reconstruction in South Dakota. The existing conditions in South Dakota for both the existing DM&E rail line and the area of proposed Extension Alternatives, are described in Section 4.1. The existing conditions in the area of the Extension Alternatives in Wyoming are discussed in Section 4.2. Impacts from reconstruction and subsequent operation of the existing DM&E rail line in South Dakota are discussed in Section 4.3. Impacts from constructing a new extension rail line across South Dakota and Wyoming into the PRB are discussed in Sections 4.4 through 4.8. The impacts, both construction and operation, associated with reconstructing portions of the existing system for which bypass construction has been proposed are discussed in Section 4.9. Impacts from construction and operation of rail yards are presented in Sections 4.10 and 4.11.

4.1 SOUTH DAKOTA - EXISTING CONDITIONS

The proposed project area in South Dakota consists of the counties in which the existing DM&E rail line is present, and areas where new construction alternatives have been proposed. In locations where DM&E currently has railroad tracks, the existing conditions adjacent to these tracks is described in the following Sections. In the area where new construction alternatives have been proposed, the existing conditions in the general area of the alignments is described in general terms. The counties in South Dakota containing existing DM&E rail line are described from east to west: Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones, Haakon, and Pennington (west to Wall). The remainder of Pennington, Custer, and Fall River Counties are described in general terms.

4.1.1 CLIMATE

The climate for the entire project area in South Dakota is characterized by cold winter periods occurring when arctic air moves in from the north and northwest, alternating with milder periods. Summers are usually warm, but there are frequent hot spells and occasional cool days. The climate is essentially uniform over all of South Dakota. However, the portion of the state east of Pierre has greater amounts of precipitation during the growing season; while the portions of the state west of Pierre, excluding the Black Hills Region, tend to be dryer, particularly during the months of April through September (Table 4.1-1). Average winter temperature in the project area is 24°F, with an average daily minimum temperature of 11°F. Average summer temperature in the project area is 72°F, and the average daily maximum temperature is 87°F. The average annual precipitation in the project area is approximately 22 inches per year. Nearly 75 percent of the annual precipitation in the project area typically falls during the growing season (April to

September). Much of the remaining 5 inches of precipitation falls as snow during the winter months of October through March. Table 4.1-1 provides a summary of climatic conditions for each county. Counties are listed east to west. Brookings, Kingsbury, Beadle, Hand, Hyde and Hughes counties are east of the Missouri River and Stanley, Haakon, Pennington, Custer and Fall River are west of the Missouri River.

Table 4.1-1
Summary of County Climatic Conditions

County	Coldest Month/Average Daily Maximum Temperature (degrees Fahrenheit)	Warmest Month/ Average Daily Maximum Temperature (degrees Fahrenheit)	Average Annual Precipitation (inches)	Average Snowfall (inches)	Wettest/Driest Month
Brookings	January/24.0	July/84.9	21.62	24.6	May/December
Kingsbury	January/22.5	July/86.3	23.63	36.1	June/January
Beadle	January/22.4	July/87.0	19.05	40.2	June/January
Hand	January/26.0	July/89.0	18.9	33.7	June/*
Hyde	January/24.8	July/88.7	19.27	34.6	June/January
Hughes	January/27.0	July/88.0	16.49	31.0	June/January
Stanley	January/25.4	July/89.0	17.9	29.2	June/January
Jones	January/30.4	July/90	17.91	35.5	June/January
Haakon	January/30.0	July/90.4	15.73	27.1	June/January
Pennington/ Custer	January/33.1	July/90.5	15.53	32.1	June/January
Fall River	January/35.5	July/91.4	16.46	42.0	May/January

*January, February and December average monthly precipitations are equal.
USDA NRSC Soil Survey Reports

4.1.2 TOPOGRAPHY

The following descriptions cover the general topography (land surface) in the project area counties.

Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones and Haakon Counties

Topography of these counties is nearly level to gently sloping terrain with many small depressions carved out by glaciers. Steep slopes occur in drainage areas adjacent to major rivers such as the Big Sioux, James, and Missouri and their tributaries (Borchers, 1980; Faulkner, 1998; Heil, 1979; Smalley, 1975; Westin, 1958; White, 1963; USGS, 1964; Vialle, 1997).

Pennington, Fall River and Custer Counties

The topography of these counties is largely influenced by the Black Hills Uplift, a large dome-like feature located in central Pennington and Custer counties. The topography generally consists of buttes, rolling hills, mountains and plains dissected by streams (Nielsen, 1996; USGS, 1964).

The larger streams that drain Custer and Pennington counties include Battle, Beaver, Boxelder, French, Pass, Pleasant Valley, Spring and Rapid creeks. These streams and numerous small streams drain into the Cheyenne River (from Soil Survey of Custer and Pennington Counties, Black Hills Parts, issued 9/90).

The Cheyenne River and its tributaries drain most of Fall River County. However, the southeast part of the county is drained by tributaries to the White River. Angostura Dam, located on the Cheyenne River south of Hot Springs, impounds water for irrigation. Most of the small drainageways outside the Black Hills are intermittent. Water flows in these drainageways after heavy rains in the spring. The Cheyenne River is the primary perennial drainageway in the project area of these counties

4.1.3 GEOLOGY AND SOILS

Geologic descriptions are divided into counties and presented in an east to west direction. These descriptions cover the general geologic setting in the project area.

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Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones and Haakon Counties

Surface geology consists primarily of glacial deposits varying in depth from several feet to over 450 feet (Schroeder, 1976; Tomhave, 1987; Tomhave,1988).

Bedrock geology of this region is generally Cretaceous dark-colored marine shale overlying white to brown sandstone and shale of terrestrial origin (Black, 1964; Duchossis, 1993; Helgerson, 1987; Lee, 1958; SDGS, 1998).

Pennington, Fall River and Custer Counties

The geology of the Black Hills Uplift is such that older resistive rocks are located in the center of the uplift and younger weaker rocks are found surrounding it. The oldest rocks are located in central and north central Custer County and are Precambrian (> 570 million years old) igneous (formed from molten lava) granites and rhyolites. Precambrian metamorphic (rocks altered by heat and/or pressure) shist, slate and quartzite surround the igneous rocks and are found in central Pennington and central Custer counties. Sedimentary (formed by deposition of solid particles) limestone, shale and sandstones of Paleozoic age lie outside the metamorphic zone and are located in eastern and western Pennington County; eastern, western and southern Custer County; and north central Fall River County. Sedimentary shale and sandstone of Jurassic and Triassic age form the outer zone of the uplift and are located in eastern and western Pennington County, eastern and western Custer County and northern Fall River County. Areas surrounding the Black Hills Uplift are mainly sandstone, chalk and siltstone of Cretaceous age (SDGS 1998).

4.1.3.1 Unique Geological Formations

Unique geologic formations are geological formations considered to be uncommon, unusual and or containing characteristics or qualities that make them of interest to science or the general public. Known geologic features unique to this region are the Badlands National Park in southeastern Pennington County, the Black Hills Uplift in central Pennington and Custer counties and Wind Cave National Park in central Custer County.

4.1.3.2 Soil Types and Characteristics

The following table shows the soil associations along DM&E's existing rail line in South Dakota and for areas of new construction. The table is followed by specific soil information by county.

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Brookings	Lamoure-Solomon-Rauville	Nearly level medium to fine textured deep soils from alluvium. Concerns: Wetness
	Volga	Nearly level medium to fine textured soils in alluvium, moderately deep to gravel. Concerns: Wetness
	Estelline-Athelwold	Nearly level medium textured loess-mantled soils, deep to gravel. Concerns: Droughtiness
	Kranzburg-Brookings-Hidewood	Gently sloping to sloping medium textured soils in loess-mantled till. Concerns: Water erosion
	Poinsett-Waubay	Gently undulating and rolling silty soils. Concerns: Water erosion
Kingsbury	Poinsett-Waubay-Buse	Well-drained and moderately well-drained, dominantly nearly level to gently rolling, silty and loamy soils; on till and moraines. Concerns: Water erosion
	Renshaw-Sioux-Marysland	Somewhat excessively-drained, excessively-drained and poorly-drained, nearly level to strongly sloping, loamy soils; on outwash plains, moraines and floodplains. Concerns: Water erosion
	Clarno-Bon	Well-drained and moderately well-drained, nearly level to moderately sloping, loamy soils; on till plains, moraines and floodplains. Concerns: Conserving moisture on agriculture land

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Beadle	Beadle-Dudley	Deep, well-drained, nearly level to undulating loamy soils; and deep, moderately well - drained, nearly level soils that have a claypan subsoil; all formed in glacial till; on uplands. Concerns: Soil blowing
	Hand-Bonilla	Deep, well-drained and moderately well-drained, nearly level to gently rolling loamy soils formed in glacial drift; on uplands. Concerns: Erosion
	Houdek-Prosper	Deep, well-drained and moderately well-drained, nearly level to gently rolling loamy soils formed in glacial till; on uplands. Concerns: Erosion
	Carthage-Hand	Deep, moderately well-drained and well-drained, nearly level to gently rolling loamy soils formed in glacial outwash and glacial drift; on uplands. Concerns: Soil blowing
Hand	Houdek-Bonilla	Nearly level to gently undulating loamy soils from glacial till. Concerns: Wind erosion
	Houdek-Cavour-Miranda	Nearly level to gently sloping loamy soils from glacial till; some soils contain claypan. Concerns: Wind and water erosion
	Williams-Cavour-Miranda	Nearly level to gently undulating loamy soils from clayey till; some soils contain claypan. Concerns: Erosion

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Hughes	Lowry-Agar	Nearly level to gently sloping, well-drained silty soils that formed in loess; on uplands and terraces. Concerns: Erosion and soil blowing
	Highmore-DeGrey	Nearly level to gently sloping, well-drained silty soils and moderately well-drained soils that have a claypan; all formed in glacial drift; on uplands. Concerns: Erosion and soil blowing
	Cavo-Raber-Demky	Nearly level to gently undulating, moderately well-drained and well-drained loamy and silty soils and soils that have a claypan; all formed in glacial till; on uplands. Concerns: Erosion and soil blowing
	Gettys-Betts	Rolling to steep, well-drained to excessively-drained loamy soils that formed in glacial till; on uplands. Concerns: Erosion
Stanley	Swanboy-Wendte-Nimbro	Deep, well-drained and moderately well-drained, nearly level and gently sloping, clayey and silty soils; on low terraces, alluvial fans and floodplains. Concerns: High shrink-swell potential, restricted permeability and flooding
	Sansarc-Opal	Shallow and moderately deep, well-drained, moderately sloping to steep, clayey soils; on uplands. Concerns: High shrink-swell potential, restricted permeability and limited depth to shale

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Haakon	Nimbro	Very deep, well-drained, nearly level, loamy soils; on floodplains. Concerns: Wind erosion
	Ottumwa-Lakoma	Very deep and moderately deep, well-drained, nearly level to strongly sloping, clayey soils; on undissected and dissected plains. Concerns: Wind erosion, water erosion and slow rate of water infiltration
	Samsil-Pierre	Shallow and moderately deep, well-drained, strongly sloping to very steep, clayey soils; on dissected plains. Concerns: Wind and water erosion
	Kirley-Lakoma-Vivian	Very deep, moderately deep, and deep, well-drained and somewhat excessively-drained, nearly level to steep, loamy and clayey soils; on terraces and dissected plains. Concerns: Water erosion
Pennington/ Custer	Nunn-Satanta	Deep, well-drained, nearly level to strongly sloping, loamy soils; on high terraces. Concerns: Wind and water erosion
	Bankard-Harverson-Lohmiller	Deep, somewhat excessively-drained and well-drained, nearly level and gently undulating, sandy, silty and clayey soils; on floodplains. Concerns: Wind and water erosion
	Orella-Fairburn-Badland	Shallow, well-drained, moderately sloping to steep, clayey and loamy soils and Badland; on dissected plains. Concerns: Erosion
	Samsil-Pierre	Shallow, and moderately deep, well-drained, moderately sloping to very steep, clayey soils; on dissected plains. Concerns: Erosion

Table 4.1-2
South Dakota Soil Associations along Existing and Proposed DM&E Rail line

County	Association	Description
Fall River	Mathias-Butche-Rockoa	Deep and shallow, well-drained, gently sloping to very steep, stony and loamy soils; on mountains and uplands. Concerns: Poorly suited to building site development and septic tank absorption fields because of the stoniness and the slope
	Tilford-Spearfish	Deep and shallow, well-drained, nearly level to steep, silty and loamy soils; on uplands. Concerns: Erosion
	Pierre-Samsil	Moderately deep and shallow, well-drained, gently sloping to steep, clayey soils; on uplands. Concerns: Wind erosion
	Glenberg-Bankard	Deep, well-drained and somewhat excessively-drained, nearly level, loamy soils; on floodplains. Concerns: Flooding

Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley and Haakon Counties

Soils in this region are similar to eastern Minnesota (Section 3.1.3.2) but contain greater amounts of clay. These soils have formed in medium textured to fine textured glacial till and glacial outwash (water from melting glaciers), and are primarily entisols and mollisols. Topography is mostly level with rolling hills, and soil production is exceptional. Soils in this region are classified as: 1) entisols; 2) alfisols; 3) mollisols and; 4) aridisols. Table 4.1-3 provides the characteristics of these soils. Mollisols occupy approximately 80 percent of this region.

Table 4.1-3
General Soil Characteristics

Soil Type	Location	Characteristics
Entisol	steep slopes, alluvial basins	shallow to deep, nearly level to very steep, well-drained, clayey to sandy loam. Concerns: low strength, shrink-swell, frost action
Alfisols	uplands	gently sloping to very steep slopes, shallow to deep, well-drained, sandy loam. Concerns: slope and large stones
Mollisols	uplands and side slopes	nearly level to strongly sloping, deep, well-drained, sandy loam. Concerns: frost action
Aridisols	moderate to steep sloped uplands	moderate to steep slopes, shallow to moderately deep, well-drained, clay, formed from weathered shale and may crack up to two inches wide during dry periods. Concerns: shrink-swell, frost action

Pennington, Fall River and Custer Counties

Soils in this region are indicative of the Black Hills of South Dakota and are formed mostly from weathering of sedimentary rocks. Organic matter is slow to accumulate and fertility is low. Topography ranges from high plateaus and mountains to rolling hills and alluvial valleys. Soils in this region are classified as: 1) entisols; 2) alfisols; 3) mollisols and; 4) aridisols.

4.1.3.3 Geologic Hazards

The United States Geological Survey (USGS) defines seismic data as the level of horizontal shaking that has a 1-in-10 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of gravity (g) (acceleration of a falling object due to gravity). For example, a shaking level of 0-2 percent indicates there is a 10 percent (1-in-10) chance of experiencing a shaking force exceeding 0-2 percent of the force of gravity in a 50-year period. Gravitational forces of 2-4 percent could be felt by some people, but would not likely cause any structural damage (USGS Shaking Hazard Maps, 1996).

Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones and Haakon Counties

Based on the 1996 United States Geological Survey Shaking-Hazard Maps, Brookings County and Kingsbury County show a 1-in-10 chance of experiencing a force of 0-2 percent of g within a 50-year period. Beadle County through the eastern half of Hughes County show a 1-in-10 chance of experiencing a force of 2-4 percent of g within a 50-year period. The western half of Hughes County through Haakon County show a 1-in-10 chance of experiencing a force of 0-2 percent of g within a 50-year period (USGS Shaking Hazard Maps 1996).

Pennington County, Fall River and Custer Counties

Based on the 1996 United States Geological Survey Shaking-Hazard Maps, all of Pennington County, excluding the southwestern corner of the county, shows a 1-in-10 chance of experiencing a force of 0-2 percent of g within a 50 year period. The southwestern corner of Pennington County through Fall River County show a 1-in-10 chance of experiencing a force of 2-4 percent of g within a 50-year period.

The southwest portion of the South Dakota Project area, in Pennington, Fall River, and Custer Counties, contain Pierre Shale formations. Pierre Shale was deposited during the middle Cretaceous times. Pierre Shale formations have a high potential for slumps or landscapes paticularly in areas of steep slopes along rivers, such as the Cheyenne River.

4.1.3.4 Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture (USDA). It is of major importance in meeting the nation's needs for food and fiber. Because prime farmland is limited, the USDA recognizes the importance of wisely using this resource. Prime farmland is defined as land that is best suited for food, feed, forage, fiber and oilseed crops. It may be cultivated land, pasture, woodland or other land. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming this land results in the least damage to the environment.

The State of South Dakota has a total of 6,516,000 acres of land classified as prime farmland. The counties in the portion of the project area east of the Missouri River have a significantly higher percentage of prime farmland than those in the central and western portions of the project area. The percentage of acres of prime farmland per county decreases west of the Missouri River. For example, Kingsbury County, on the eastern side of South Dakota, has approximately 328,648 acres of prime farmland, or nearly 59 percent of the soil in Kingsbury County meets the requirements of prime farmland (USDA 1997). Haakon County in the west central portion of the project area, west of the Missouri River, has approximately 2,120 acres of prime farmland, or less then 1 percent of the soil in this county meets the requirements for prime farmland. (USDA, 1982). The project area within Fall River County has approximately 12,000 acres of soil, or about 1 percent of the county, that meet the requirements of prime farmland only when irrigated, otherwise none of the soils in Fall River are considered prime farmland (NCRS 1999). Table 4.1-4 lists the amount of prime farmland in the counties within the project area.

Table 4.1-4
Prime Farmland

County	Prime Farmland (acres)	Percentage of Prime Farmland Acreage
Brookings	373,833	73
Kingsbury	328,648	59
Beadle	9,060	1
Hand	33,916	3
Hyde	108,635	20
Hughes	26,148	6
Stanley	0	0
Jones	80,516	13
Haakon	2,120	0.18
Pennington	0	0
Custer	0	0
Fall River	12,000*	1*

* Only considered prime farmland when irrigated, NCRS Soil Survey of Fall River County, South Dakota

4.1.3.5 Paleontological Resources

Paleontological resources are extensive in western South Dakota. In this area of the project, geologic formations containing an abundance of fossils and prehistoric resources are present and often at ground surface due to past erosional forces. In eastern South Dakota, conditions and formations conducive to fossil formation were not as common. Paleontological resources are occasionally encountered; however, they are widely scattered. Therefore, the following discussion deals primarily with western South Dakota due to the variety, abundance, and importance of the paleontological resources in this area.

The paleontological resources encountered in South Dakota vary in age and fauna depending on the underlying geologic formation. Geologic formations are broadly categorized as Quaternary (0.01 million years ago (mya) – 1.6 mya), Tertiary (1.6 mya – 66 mya) and Cretaceous (66 mya – 144 mya) in age. Quaternary sediments include a variety of surficial deposits such as alluvium, wind blown material, landslides, colluvium and terraces of multiple ages. These deposits consist of reworked sediments derived from older units and they contain reworked fossils from older units as well as Quaternary fossils. Tertiary formations, in order of increasing age are the Brule, Chadron, Tongue River, Lebo and Tullock. Cretaceous formations in order of increasing age include: the Lance, Fox Hills, Pierre Shale, Niobrara, Carlile Shale, Greenhorn, Belle Fourche Shale, Mowry Shale, Newcastle Sandstone, Skull Creek Shale, Fall River and Lakota.

Quaternary deposits in the proposed project area may contain a broad spectrum of terrestrial fauna and flora, including all Holocene and Pleistocene taxa.

Faunal lists from different Quaternary localities generally reflect the climate and conditions in which the deposit accumulated.

Commonly found paleontological resources within these units include mammals, reptiles, amphibians, birds, fish, and numerous invertebrate and plant species. Faunal lists from these units often include: bison (*Bison)*, horses (*Equus*), camels (*Gigantocamelus*), deer (*Odocoileus*), rabbits (*Lepus, Sylvilagus*), rodents (*Cynomys, Spermophilus, Castor, Peromyscus, Microtus*), snakes (*Crotalus, Pituophis*), toads and frogs (*Bufo, Rana*), clams and snails (Pinsof, 1985). Quaternary deposits containing these taxa occur discontinuously along the entire proposed project area.

Tertiary formations also contain a wide variety of fauna and flora. Oligocene and Eocene taxa within the Brule and Chadron formations are terrestrial in origin and commonly include: oreodonts (*Merycoidodon*), horses (*Mesohippus, Miohippus*), camels (*Poebrotherium*), rhinoceros (*Hyracodon, Subhyracodon, Metamynodon*), pigs (*Archaeotherium, Elotherium, Dinohyus*), titanotheres (*Megacerops, Brontotherium, Titanotherium*), ruminants (*Hypertragulus, Leptomeryx, Hypisodus*), carnivores (*Hyaenodon, Daphoenus, Dinictis, Hoplophoneus*), rabbits (*Palaeolagus, Hypolagus*), rodents (*Ischyromys, Eutypomys, Steneofiber, Eumys*), turtles (*Stylemys, Geochelone*), crocodiles (*Crocodilus*), snails (*Helix*), and plant seeds (*Celtis*). Lacustrine deposits within these terrestrial sediments also contain fish, reptiles and mollusks (O'Harra, 1920). Brule and Chadron exposures containing the above taxa occur at various localities between the eastern flank of the Black Hills and the Missouri River in South Dakota.

Cretaceous formations are primarily shallow and near-shore marine and terrestrial sediments which accumulated as a result of transgressive and regressive marine cycles in the western interior seaway. Faunas within these Cretaceous units commonly include marine reptiles, sharks, fish and a diverse molluscan assemblage. Dinosaurs and other terrestrial reptiles, amphibians, fish, and rare, primitive mammals occur within units such as the Lance and Fox Hills formations. Dinosaur remains and tracks, as well as fish, are also found in the Lakota Formation. Marine fossil assemblages within these units include: Mosasaurs (*Tylosaurus, Clidastes, Plioplatecarpus, Platecarpus*), Plesiosaurs (*Polycotylus, Elasmosaurus*), lizards (*Coniasaurus*), aquatic birds (*Hesperornis*), sharks (*Squalicorax, Ptychodus, Lamna, Cretolamna, Carcharias*), fish (*Enchodus, Xiphactinus, Ichthyodectes, Gillicus, Cimolichthys, Lepidotus*), mollusks (*Baculites, Acanthoceras, Dunveganoceras, Scaphites, Collignoniceras, Prionocyclus, Mytiloides, Pseudoperna*), plants and petrified wood. Lower Cretaceous sandstone of the Fall River and Lakota formations occur through the foothills of the southern Black Hills, as do most of the other Cretaceous shale, marl and limestone units listed above. The Pierre Shale is a widespread unit occurring throughout much of the project area between the Black Hills and the Missouri River. Terrestrial and near-shore sediments of the Fox Hills Formation occur both on the southwestern flank of the Black Hills and at several locations east of the Black Hills.

4.1.4 LAND USE

4.1.4.1 Agriculture

Crop production is an important land use in eastern South Dakota. The primary crops produced include sunflowers, corn, soybeans, grain sorghum, alfalfa, wheat, and oats. The portion of the project area that includes the existing DM&E rail line passes through approximately 170 miles of prime farmland, approximately 303.0 miles of cropland, and approximately 182.3 miles of pasture land in South Dakota.

In the western portion of the project area (particularly Pennington and Custer counties) the conditions are dryer and crop production is less prevalent. Fall River County, in the southwest portion of the proposed project area, has approximately 12,000 acres of land irrigated by the Angostura Unit of the Bureau of Reclamation that is planted mainly in corn and alfalfa. Limited crop production is practiced in the remainder of the western project area with winter wheat and other small grains being grown as well as tame hay and other feed crops.

Ranching is the principal enterprise in the portion of the project area for the Extension Alternaives. As much as 80 percent of the acreage in this portion of the project area is used for raising beef cattle and sheep and much of the cultivated land is used to raise livestock feed.

As shown in Table 4.1-5, between 1982 and 1992, the number of acres of farmland increased in the State of South Dakota. Brookings, Hyde, Hughes, Stanley, Jones, Jackson and Custer counties saw an increase in acreage, while Kingsbury, Beadle, Hand, Haakon, Pennington and Fall River counties saw a decrease in the number of acres of farmland. The number of farms decreased in the state and in Brookings, Kingsbury, Beadle, Hand, Jones, Haakon and Fall River counties, while Hyde, Hughes, Stanley, Jackson, Pennington and Custer counties saw an increase in the number of farms. The average size per farm increased in the state and in Brookings, Kingsbury, Beadle, Hand, Hughes, Jones, Custer and Fall River counties. In Hyde, Stanley, Jackson and Pennington Counties, the average farm size decreased. In Haakon County, average farm size remained the same.

Table 4.1-5
Agricultural Statistics of South Dakota and Potentially Affected Counties

Affected Area	Change in Farmland Acreage (1,000) 1982-1992	Change in Number of Farms 1982-1992	Change in Average Size of Farms (acres) 1982-1992
South Dakota	2.3	-8.3	11.6
Brookings	0.2	-9.5	10.8
Kingsbury	-4.0	-15.0	13.0
Beadle	-1.6	-7.0	5.7
Hand	-0.6	-14.0	15.6
Hyde	0.2	1.3	-1.1
Hughes	6.8	1.6	5.0

Table 4.1-5 Agricultural Statistics of South Dakota and Potentially Affected Counties			
Affected Area	**Change in Farmland Acreage (1,000) 1982-1992**	**Change in Number of Farms 1982-1992**	**Change in Average Size of Farms (acres) 1982-1992**
Stanley	5.0	18.6	-11.4
Jones	8.1	-10.8	21.2
Haakon	-0.3	-0.3	NC
Jackson	8.9	16.0	-6.1
Pennington	-0.9	10.2	-10.1
Custer	10.5	7.0	3.4
Fall River	-2.7	-11.3	9.7
1996 County and City Extra, Annual Metro, City and County Data Book County and City Data Book, 1988			

4.1.4.2 Residential

The existing rail line passes through, or very close to, 46 communities (discussed in more detail in Section 4.1.7). Approximately 2.9 miles of residential land is adjacent to the existing DM&E rail line between Brookings County and Pennington County. The larger communities in the project area include Brookings, Huron and Pierre. Residences and ranches are widely scattered throughout the rural areas.

4.1.4.3 Business and Industrial

The existing DM&E rail line passes adjacent to approximately 36.9 miles of business and industrial land from Brookings County to Pennington County. Nearly all of the communities through which the existing rail line passes contain business and/or industrial areas. Some of the major employers in communities along the existing rail line include South Dakota State University, Larson Manufacturing, Daktronics, 3M Company and Brookings Hospital in Brookings; Good Samaritan Nursing Center in De Smet; Huron Public Schools, Huron Regional Medical Center and the U.S. Government in Huron; the Prairie Center in Miller; State Government, St. Mary's Hospital and Pierre School District in Pierre; and KroFam & Subsidiaries in Philip (South Dakota Office of Economic Development 1999).

4.1.4.4 Minerals and Mining

Brookings, Kingsbury, Haakon, Hand, Hughes, Hyde, Jackson, Jones and Beadle Counties

No coal, oil, gas, or mineral resources are known to exist within the project area in South Dakota (USGS, 1996; USGS, 1997). However, sand and gravel deposits are quarried at numerous locations in these counties.

Pennington, Fall River and Custer Counties

Numerous oil and gas wells are known to exist in north central Fall River County and south central Custer County (Bretz, 1981; SDGS Custer County, 1998; SDGS Fall River County). No coal deposits are known to exist in this region (USGS,1996).

4.1.4.5 Public Facilities

Most of the communities in the project area are small. Most communities have only one elementary, middle and senior high school and many of the small communities bus the children to schools in larger communities or to shared rural schools. Many of the communities have clinics and/or doctor and dentist offices. However, most communities do not have hospitals. There are churches in the area as well as recreational facilities. Section 4.1.7 provides a more detailed description of the communities within the South Dakota project area.

4.1.4.6 Federal Lands

4.1.4.6.1 Forest Service Lands

Buffalo Gap National Grassland

The Buffalo Gap National Grasslands is located in southwestern South Dakota. It includes over 595,000 acres, intermingled with private, state, Indian Reservation, and National Park Land. These lands are not a continuous unit but a patchwork of lands throughout the region. The USFS attempts to consolidate these lands into larger continuous parcels through purchase, land exchange, or other means. Much of the Buffalo Gap National Grasslands (BGNG) under the USFS control are permitted to local ranchers for grazing or hay production.

The Buffalo Gap National Grassland can be divided into the "east half" and "west half." The east half extends east and west from near Kadok to the Cheyenne River and north and south from U.S. Highway 14 to the Pine Ridge Indian Reservation. The west half extends east and west between the Cheyenne River and the Wyoming border and extends south to the Nebraska Border.

The vegetation on the Buffalo Gap National Grassland consists of mixed-grass vegetation. The area is a mix of rolling prairie and badland topography. The grassland area is inhabited by pronghorn, mule deer, white-tailed deer and prairie dogs. In addition to these animals, experimental populations of black-footed ferrets were introduced in the Conata Basin/Badlands area in 1996. There are also large beds of agates and vertebrate and invertebrate fossils in the grasslands.

Black Hills National Forest

The Black Hills National Forest is another area managed by the USFS. The forest name is derived from Lakota Indian words, Paha Sapa, meaning "hills that are black." The pine-covered hills cover an area 125 miles long and 65 miles wide. This area includes rugged rock formations, canyons and gulches, open grassland parks, streams, lakes and unique caves (USFS 1998a).

After a series of large forest fires in 1893, President Grover Cleveland established the Black Hills Forest Reserve. This protected the forest against fires, wasteful lumbering and timber fraud. The Black Hills National Forest was established once the reserve was transferred to the USFS (USFS 1998a).

Today this National Forest provides outstanding scenery and a mild climate. These combine to provide excellent surroundings for the over 100 developed recreation sites, including campgrounds, picnic areas, swimming beaches, boat launches and scenic overlooks. There is also much hiking, fishing and boating in the area (USFS 1998b). Most of the over 600 miles of trails are concentrated in the Norbeck Wildlife Preserve. These trails are open to hikers, mountain bikers, cross country skiers, snowmobilers, horseback riders and motorcycle riders (USFS 1997).

The Norbeck Wildlife Preserve was established to protect and to provide a breeding area for game animals and birds. The Preserve covers 35,000 acres and most of the area is located in Custer State Park. Motorized vehicle use is restricted to roadways, no vehicles are allowed on the trails in the preserve. Approximately 25,000 of these acres are managed by the USFS. The 9,824-acre Black Elk Wilderness is in the center of the Preserve. This area was named for Black Elk, an Oglala Lakota holy man (USFS 1998a).

The USFS is required to inventory, evaluate and consider all roadless areas for possible inclusion in the National Wilderness System. In June of 1977, the USFS initiated a comprehensive process to evaluate areas to be designated roadless and undeveloped. The process by which these lands were evaluated is known as the Roadless Area Review and Evaluation or RARE II. A RARE II area is one that has met the following criteria:

- the area must be larger than 5,000 acres or, if smaller, contiguous to a designated wilderness or primitive area;

- the area could not contain improved roads maintained for travel by standard passenger-type vehicles;

- the area must be inventoried by the USFS for possible inclusion in the National Wilderness Preservation System.

Three RARE II areas were identified on the BGNG in South Dakota during the preparation of the 1984 Forest Management Plan: the 24,670 acre Indian Creek Area, the 9,700 acre Red Shirt Area, and the 7,570 acre Cheyenne River Area (PIC Technologies, Inc. 2000). All three of these areas are within the South Dakota project area.

As a result of recent revisions to the USFS grassland management plan, a third roadless desiganation has been instituted. Under this process, areas are designated as Inventoried Roadless areas. The criteria for this designation, while similar to RARE II, has been modified to allow more lands to meet the standards for inclusion in the National Wilderness Preservation System. There are three areas on the BGNG that meet the criteria of Inventoried Roadless Areas that were not designated as RARE II areas. Two of these areas, the Jim Wilson Canyon Inventoried Roadless Area, and the First Black Canyon Inventoried Roadless Area, are in close proximity to the project area. The third, the Red Shirt Inventoried Roadless Area is within the project area. The entire 15,970 acre Red Shirt Area, including the Red Shirt RARE II and Red Shirt Inventoried Roadless Area has been recommended for wilderness classification under the USFS proposed grassland plan. The Sage Creek Wilderness Area is located approximately 6.2 miles from the project area within the Badlands National Park.

4.1.4.6.2 National Park Service Lands

Badlands National Park was designated a national monument in 1939 and redesignated a National Park in 1978. Badlands National Park preserves a diversity of significant resources. These resources include the best known Oligocene fossil deposits contained within archetypical Big Badlands formations, a rich and varied cultural history spanning from paleo-Indian occupation through the early twentieth century homesteading period, and an expansive mixed grass prairie ecosystem. Other qualities, most notably include the wilderness character, but also include the quiet, solitude, vastness and natural processes observed, opportunities for hiking, camping, wildlife viewing, scenic drives and presence of vistas, research and education, and quiet contemplation. There are approximately 1.3 million visitors per year to Badlands National Park with the highest visitation from mid-June through September; lowest from mid-November through March.

Wind Cave National Park was created on January 3, 1903. It was the 7th National Park and the first created to protect a cave. The park at that time was small. As the park boundaries expanded, herds of bison, elk, and pronghorn were added. One of the world's longest most complex caves and 28,295 acres of mixed-grass prairie, ponderosa pine forest, and associated wildlife are the main features of the park. The cave is well known for its outstanding display of boxwork, an unusual cave formation composed of thin calcite fins resembling honeycombs. The park's mixed grass prairie is home to native wildlife such as bison, elk, pronghorn, mule deer, coyotes, and prairie dogs (GORP No Date).

Jewel Cave, the third longest cave in the world, is approximately 13 miles west of Custer, South Dakota. The Jewel Cave National Monument offers tours, picnic areas and two hiking trails and a United States Forest Service trail. There is also a log cabin ranger station listed on the National Register of Historic Places (NPS 1999).

Mount Rushmore National Memorial is located in the Black Hills National Forest. The memorial and the Sculptor's Studio, built in 1939, are the main attractions. However, a new Visitor Center and the Presidential Trail both opened in the summer of 1998. Guided walks and ranger programs are also available (NPS 1998).

4.1.4.6.3 Bureau of Land Management Lands

After the original 13 colonies ceded lands to the Federal government, laws were set up to provide for surveys and the settlement of these lands. As additional lands were acquired by the United States from other countries, these were also surveyed and settled. Soon the General Land Office was established to oversee the disposition of these lands. By the late 19th century, there was a shift in Federal land management priorities. At this time the first national parks, forest and wildlife refuges were established. These lands were withdrawn from settlement because of their resource values. In the early 20th century, Congress directed the Executive Branch to manage activities on public lands. The U.S. Grazing Service was established to manage the public rangelands. Soon this agency was merged with the General Land Office to form the Bureau of Land Management (BLM) within the Department of the Interior (BLM 1998a).

The BLM is responsible for addressing the needs of a rapidly growing and changing West, balancing the public need with environmental conservation (BLM 1998a). It manages large areas of Federally owned lands and interests in lands (for example, Federally owned mineral estates) that are administered by the Secretary of the Interior for mineral, oil, and gas resources, as well as for rangeland and wildlife habitat. It provides service and maintenance for BLM-owned buildings, recreation facilities, water and sewer systems, roads, trails and bridges that are located on public lands. The BLM also manages and locates abandoned mines on public lands and remedies high-priority hazards (BLM 1998b).

The BLM employs law enforcement officers to protect visitors and the natural resources on public lands. They ensure compliance with Federal laws and land use regulations on BLM land. The BLM also keeps records of current and historical information about land ownership and use (BLM 1998b).

Payments in lieu of taxes are made to tax-exempt Federal lands administered by the BLM as well as other agencies. These funds are based on a formula and are appropriated by Congress. Other revenue is derived from commercial activities on Federal lands, such as oil and gas leasing, livestock grazing and timber harvesting. These lands also represent a large part of the Nation's natural and cultural heritage. The BLM is usually required to inventory, evaluate and protect such features as rare geologic formations; rare and vulnerable plant and animal communities; wild free-roaming horse and burro herds; wilderness areas and Wild and Scenic Rivers; and paleontological, archaeological and historical sites (BLM 1998b).

In South Dakota, BLM lands provide opportunities for livestock grazing, and rights-of-way for other permits and leases. (BLM 1998b). Parcels of BLM lands are scattered throughout the project area, paticularly in the southwest area of South Dakota through which the Extension Alternative projects would pass.

4.1.4.6.4 Bureau of Reclamation Lands

Lands associated with two U.S. Department of the Interior, Bureau of Reclamation (Reclamation) projects occur in the project area. These are discussed below.

<u>Angostura Irrigation Project</u>

The Angostura Unit, which consists of Angostura Dam, Reservoir, and the associated irrigation distribution system, is located nine miles southeast of Hot Springs, just west of the Pine Ridge Indian Reservation. Benefits of the Project include irrigation, flood control, fish and wildlife conservation, recreation and sediment control. The dam impounds the Cheyenne River near Angostura Canyon. (USBR 1998)

The construction of the dam occurred from 1946-49. Water was first delivered in 1953. By 1956, water was available to 12,218 acres of irrigable lands.

The reservoir currently provides irrigation for 12, 218 acres below the dam along both sides of the Cheyenne River. An additional 184.8 acres, including 139 acres of the Hot Springs airport and 45 acres on private land, are provided irrigation water from the reservoir, but only when the reservoir surface water level is above 3,184.2 feet in elevation (Angostura Unit Water Service Contract Renewal, U.S. Department of Interior, July 1997)

Oahe Unit

The Oahe unit consists of the Oahe Reservoir, and the partially completed 31-mile Pierre Canal. The original plans for the Oahe Unit call for a reservoir near Blunt, and one north of Huron on the James River. Property for the Blunt reservoir has been acquired, but the reservoir has not been constructed.

The Oahe unit is part of the Pick-Sloan Missouri Basin Program. The project was authorized for construction in 1968 for the purpose of furnishing irrigation water to approximately 190,00 acres of land, providing flood control, developing fish and wildlife habitat, and furnishing municipal and industrial water supply.

The Pierre Canal was designed to be approximately 33 miles long and extend from the Oahe Reservoir Dam eastward to the James River north of Huron. The Pierre Canal would supply water to the Blunt Reservoir and eventually supplement the James River Reservoir through a series of pumps and gravity flow structures. At present, the canal is approximately 30 percent complete. At a point approximately 3.5 miles northeast of Canning, South Dakota, the existing DM&E rail line would cross a section of land owned by Reclamation. This strip of land is approximately 200 feet wide and was purchased by Reclamation to construct a water control structure on the Pierre Canal. To date, no structure has been constructed. However, the land remains under ownership of Reclamation. The status of the Oahe Unit is uncertain, and construction of the Pierre Canal and the Blunt Reservoir has been terminated.

4.1.4.6.5 Fish and Wildlife Service Lands

Waterfowl Production Areas

The U.S. Fish and Wildlife Service (USFWS) manages lands within the project area to provide nesting and brood rearing habitat for waterfowl production. These Federal lands include temporary and permanent wetlands and associated upland habitats that are important for waterfowl nesting of waterfowl. They also provide hunting opportunities for waterfowl and other wildlife species. The existing DM&E rail line passes through or within one mile of 12 Federal waterfowl production areas. The locations of the various waterfowl production areas (WPA) are given in Table 4.1-6 below by township, range and section or sections. None of the waterfowl areas occupy an entire section, however some occupy portions of one or more sections.

Table 4.1-6
Waterfowl Production Areas along DM&E's Existing Rail Line in South Dakota

Location	Name	County	Closest City	Rail Line
T110N, R51W, Sec 20		Brookings	2 miles southwest of Volga	< 1 mile north
T110N, R51W, Sec. 18		Brookings	3 miles northwest of Volga	passes through about ½ mile of this area
T110N, 52W, Sec. 10	Dry Lake/ Selken/ Van Moorlehen	Brookings	6 miles northwest of Volga	passes through about 2 miles
T111N, R52W, Sec. 31		Brookings	less than 1 mile north of Arlington	little more than 1 mile south
T111N, R53W, Sec. 35		Kingsbury	1 mile northwest of Arlington	0.1 mile north
T110N, 53W, Secs. 5 and 8	Pickering	Kingsbury	1 mile southeast of Hetland	1.3 miles north
T111N, 55W, Secs. 34 and 27		Kingsbury	2 miles northwest of Lake Preston	0.7 mile south
T111N, R55W, Secs. 29, 31 and 32		Kingsbury	3 miles east of De Smet	immediately adjacent to the south for 0.5 mile
T111N, 56W, Secs. 26, 23, 22, 35 and 36	Halverson	Kingsbury	Just east of De Smet	passes through approximately 1.5 mile

Table 4.1-6
Waterfowl Production Areas along DM&E's Existing Rail Line in South Dakota

Location	Name	County	Closest City	Rail Line
T111N, 59W, Secs. 32 and 29	Beaver	Beadle	3 miles east of Cavour	0.7 mile south
T111N, R63W, Secs. 33 and 34	Maga Ta-Hohpi and Weaver	Beadle	3 miles southeast of Wolsey	0.8 mile north
T111N, R63W, Sec. 21		Beadle	2 miles east of Wolsey	0.15 mile south
T111N, R65W, Sec. 13		Beadle	3.5 miles northwest of Wolsey	1 mile south

SD GF&P 1998a

In addition to WPA's, the USFWS also maintains easements on privately held wetland areas for the production of waterfowl and wildlife habitat. There are approximately 25 wetland easement areas within one mile of the existing DM&E rail line in Brookings, Kingsbury, Beadle and Hand counties. The rail line passes through 0.6 mile of wetland easement in Brookings County; 3.45 miles in Kingsbury County; and 7.25 miles in Beadle County.

4.1.4.7 Reservation and Treaty Lands

Reservations for Native Amercans, or American Indians, occur throughout the Great Plains. Reservations are lands ceded to various Tribes upon which to live and sustain themselves. Several reservations are located in South Dakota. While the existing DM&E rail line does not pass through any existing reservations, there are 3 reservations that would be within 10 miles of the proposed project. As the existing DM&E rail line passes through Hughes County, it turns sharply westward at Rousseau, South Dakota. At this point the rail line passes less than 3 miles northwest of the Lower Brule Reservation and less than 10 miles northwest of the Crow Creek Reservation.

The Lower Brule Reservation belongs to the Lower Brule Sioux Tribe. It is located in northern Lyman County and the southeast corner of Stanley County.

The Crow Creek Reservation belongs to the Crow Creek Sioux Tribe. It is located in the southeast portion of Hughes County, the southern edge of Hyde County and the western half of Buffalo County.

The Pine Ridge Reservation belongs to the Oglala Sioux Tribe. It is located in Shannon and Jackson counties. The existing DM&E rail line is within one mile of the Pine Ridge Reservation. The Extension Alternatives range from less than one mile west (Alternative B) to over 12 miles west (Alternative D) of the Reservation.

The Treaty of 1851 established all the lands in South Dakota west of the Missouri River as lands of the Sioux Nation. Although the Treaty of 1868 established reservations for the Sioux Tribes, the Treaty of 1851 was never rescinded. Today those Treaty lands, including the counties of Haakon, Stanley, Jackson, Pennington, Custer and Fall River, are disputed by several Tribes as still being the property of the Sioux Nation.

4.1.4.8 State Lands

State Game Production Areas

The State of South Dakota owns and manages lands throughout the state for game production. While USFWS waterfowl production areas are primarily to provide habitat for ducks and geese, game production areas provide habitat for a variety of wildlife including waterfowl, deer, turkey and upland birds. The existing rail line passes through or within 1.0 mile of 7 state wildlife areas or refuges (SDGFP 1998a). These areas are managed by the state to provide wildlife production and public hunting opportunities as follows:

- A state game production area is located just southwest of De Smet in Kingsbury County. This production area is less than 0.5 mile south of the rail line and is located at T111N, R56W, Sec. 34.

- A state game production area at Lake Iroquois is located about 1 mile southeast of Iroquois, in Kingsbury County. This game production area is approximately 1 mile south of the rail line and is located at T110N, 58W, Sec. 8.

- A state game production area is located approximately 3.5 miles northwest of Wolsey. This production area, in Beadle County, is about 1,000 feet south of the rail line. The state game production area is located at T111N, R64W, Sec. 18 and T111N, R65W, Sec. 13.

- The Woodruff Lake State Game Production Area is located in Hughes County about 1.5 miles southwest of Harrold. It is less than one mile south of the rail line and is located at T112N, R75W, sec. 18 and T112N, R76W, Sec. 13.

- As the existing DM&E rail line curves west at Rousseau, Hughes County, approximately 11 miles east of Pierre, it passes along the northern boundary of the Arikara State Game Production Area for approximately 5 miles. This area is located along the north bank of the Missouri River, between the river and existing rail line.

- Less than 0.5 mile south of the rail line, just south of Philip in Haakon County, is a small state game production area. This area is located at T1N, R20E, Sec 24.

- A state game production area is located approximately 1 mile southwest of Wall in Pennington County. This area is less than one mile south of the rail line and is located at T1S, R15E, Sections 1 and 2.

- The existing rail line passes through a small state game production area north of Oral in T7S, R7E, Section 8, approximately 1.5 miles south of Buffalo Gap.

- As the existing DM&E rail line continues south, it intersects the Scherbarth GPA south of Oral, at T8S, R7E, Sections 3 and 2. The Oral GPA is located approximately 2.5 miles east of the existing DM&E rail line at T7S, R7E, Section 36.

State Parks

Oakwood Lakes State Park is located approximately seven miles northwest of Volga, South Dakota, in Brookings County. This park is situated between eight glacial lakes and offers campgrounds, picnic areas, hiking trails, as well as swimming and boating facilities. Three burial mounds are located in the park. The park grounds were historically the summer camp and annual gathering spot for Native American Indians. The park also offers four miles of cross-country ski trails for winter recreation. Oakwood Lakes State Park and the burial mounds are located eight miles north of the existing DM&E rail line.

Lake Thompson State Recreational Area is located about five miles southwest of Lake Preston, South Dakota, in Kingsbury County. The lake is known for its prosperous fishing. By the year 2005, the Lake Thompson Recreation Area will be located on the northeast shore of the lake. Planned facilities include campsites, group campgrounds, cabins, rental lodge, comfort stations, boat ramps, a fish cleaning station, a sewage dump station, swim and ski beaches, picnic shelter, park shop/office, shoreline trails, playgrounds, asphalt roads and parking lots.

Approximately 4 miles east of Pierre, DM&E's existing rail line passes along approximately 2 miles of the northern boundary of Farm Island State Recreation Area. This 1,235 acre state recreation area is situated on the shores of the Missouri River. It provides abundant boating and fishing opportunities. The park also offers swimming, hiking, cross country skiing trails, campgrounds, campsites, camping cabins, boat ramps, a fish cleaning station, comfort stations, a sewage dump station, a group camping area, picnic shelters, playgrounds, and an amphitheater. The park also has several different wildlife habitats and includes the 500-acre Farm Island Nature Area. The state recreation area is home to many different species of plant and animal life and its trails are listed in the National Registry of Recreation Hiking Trails.

Custer State Park is located over 20 miles northwest of Oral, South Dakota. The park encompasses 73,000 acres in the Black Hills. Activities at the park include hiking, mountain biking, horseback riding, rock climbing, chuckwagon suppers and jeep rides, and shows at the Black Hills Playhouse. There is also Needles Highway scenic drive which provides access through the park. Custer State Park is the home of Sylvan Lake, Legion Lake, Blue Bell and State Game Lodge resorts. Opportunities for scenic camping also exist at the parks seven campgrounds. The park is home to the largest herd of bison in the world. Other wildlife that occur in the park include antelope, mountain goats, bighorn sheep, deer, elk, wild turkeys and burros (South Dakota State Parks 1998). The east boundary of Custer State Park comes within one mile of the existing DM&E rail line north of Buffalo Gap, South Dakota.

Recreation opportunities at the Angostura Recreation Area are currently the responsibility of the South Dakota Department of Game, Fish and Parks (SDGFP). These recreational opportunities include campgrounds, campsites, comfort stations, a fish cleaning station, a fishing pier, picnic shelter, an RV dump station, boat ramps, swimming beach, playgrounds, hiking trails, a floating concession stand, and pontoon, fishing boat, waverunner, paddle boat and cabin rentals.

4.1.4.9 Utility Corridors

Utility corridors occur throughout the project area including natural gas, petroleum, telephone, water, sewer, and electricity. Many cross the existing rail line, while others parallel it. Natural gas needs are met by Northwestern Public Service Company. Electricity needs are met by Otter Tail Power Company, Aurora Utility Company, Western Area Power, Northwestern Public Service, West Central Electric and Black Hills Power and Light Company. Water supply is met by wells in the Big Sioux and Dakota aquifers. Wastewater treatment is handled by lagoons, activated sludge treatment plants and stablilization ponds.

4.1.5 WATER RESOURCES

4.1.5.1 Surface Water

Surface water in the project area occurs as rivers, lakes, streams and ponds. The major rivers in the project area include the Big Sioux, James, Missouri, Bad (including north and south forks) and Cheyenne rivers. Surface water drainage varies throughout the project area. In eastern South Dakota, the Big Sioux and James rivers flow south to the Missouri River. The White and Bad Rivers drain most of the central portion of the project area, with both flowing northeast into the Missouri River. The Cheyenne River also flows northeast into the Missouri River, and along with the White River, drains most of southeastern South Dakota. The Missouri River flows southeast through the center of the project area.

There are many small lakes and ponds in the project area. They are usually found in pastureland and serve to provide watering areas for livestock. As discussed above, the Angostura Reservoir and Irrigation Project is located nine miles southeast of Hot Springs. This impoundment of the Cheyenne River is used to provide water to irrigate crops.

The existing DM&E rail line in South Dakota, between the Minnesota State line and Wall, South Dakota crosses 7 rivers and 16 perennial streams including Deer Creek and the Big Sioux River, the James River, Medicine Creek, the Missouri River, the Bad River, and Cottonwood Creek. In addition it crosses 230 intermittent and unnamed streams. Additional drainages in southwest South Dakota include Rapid Creek, Boxelder Creek, Cheyenne River, Spring Creek, Battle Creek, Antelope Creek, French Creek, Lame Johnny Creek, Horsehead Creek and Hat Creek.

The portion of the project area that would be crossed by the Extension Alternatives contains numerous perennial and intermittent streams in the Cheyenne River drainage.

Surface water withdrawal for South Dakota in 1990 was between zero and 2,000 million gallons per day. Total water withdrawal for South Dakota in 1990 was also between zero and 2,000 million gallons per day.

The streams within the project area are typical for the region, and their flow events are closely reflective of precipitation patterns. Flow events frequently result from snowmelt during the late winter and early spring. Although peak discharges from such events are generally small, the duration, and therefore percentage of annual runoff volume, can be considerable. During the spring, storms increase soil moisture, hence decreasing infiltration capacity, and subsequent rainstorms can result in both large runoff volume and high peak discharges. The surface water quality varies with the streamflow rate; the higher the flow rate, the lower the total dissolved solids concentration, but the higher the suspended solids concentration.

4.1.5.2 Floodplains

Larger rivers within the project area contain floodplain areas. Rivers with some kind of floodplain development include the Big Sioux, James, White, Bad and Missouri Rivers. The Missouri River has the most developed floodplain in the project area. However, much of it is presently inundated as Lake Sharpe. This helps stabilize the water level in the river and reduce the dramatic fluctuations that may occur during flooding. The other rivers have less developed floodplains. The Cheyenne River is partially impounded by the Angustora Dam, creating Angustora Reservoir. The reservoir has helped stabilize the flow within the downstream stretches of the Cheyenne River. However, with the exception of the Missouri River, other area rivers experience dramatic seasonal fluctuations in water levels due to heavy rains or rapid snow melt, often resulting in flooding throughout the drainage.

4.1.5.3 Wetlands

Wetlands found within the project area are important regional ecosystems. These natural communities provide filtration of sediments and pollutants from surface water runoff, flood water retention, erosion control, resting, foraging, and nesting habitat for waterfowl and mammals, fish spawning, nursery habitat, and amphibian habitat.

Wetlands are defined, for regulatory purposes, in the Clean Water Act. This definition is used by the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) to administer the permit program outlined in Section 404 of the Act. Wetlands under COE jurisdiction are defined as follows:

> "Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Wetlands generally include swamps, bogs and similar areas (40 CFR 230.3 and 33 CFR 328.3)."

In order to be classified as a wetland, an area must possess three characteristics, hydric soils, a dominance of hydrophytic vegetation, and wetland hydrology. Sites must meet all criteria before being designated as a jurisdictional wetland.

Wetlands often are found in a transition zone between open water and upland systems. These sites are often inundated or saturated for prolonged periods during the growing season (May through September in the project area). Wetland hydrology in the project area is provided by stream flooding, saturation from the water table, precipitation, and, in the western part of South Dakota, seepage associated with the distribution of irrigation water.

The eastern and central part of the South Dakota project area are within the Prairie Pothole Region. Prairie potholes are shallow, glacially carved depressions that often hold water throughout the year. The potholes range from wet prairies to seasonal marshes to permanent water. These wetlands have regional and national significance in providing nesting and resting areas for waterfowl and shorebirds.

Western South Dakota is more arid and contains less permanent wetlands than the central and eastern part of the state. In this part of the project area, riparian wetlands associated with river systems comprise most of the wetland acreage. In addition, irrigation projects and stock ponds provide wetlands in this region.

Wetlands found in the project area may be classified in three categories based on the dominant vegetation occurring at the site. Forested wetlands are characterized by woody vegetation that is greater than 6.0 meters tall (Cowardin et al. 1979). The dominant trees found in forested wetlands within the project area are cottonwood (*Populus* spp.) and willow (*Salix* spp.). These wetlands occur along major streams and rivers within the project area. In addition, these wetlands are often only seasonally flooded during the spring and during heavy run-off periods .

Scrub/shrub wetlands are characterized by woody vegetation less than 6.0 meters in height. These wetlands consist of a mixture of shrubs and small trees. Common species found in scrub/shrub wetlands include willow (*Salix* spp.), alder (*Alnus* spp.), sedges (*Carex* spp.), rushes (*Juncus* spp.) and jewel-weed (*Impatiens capensis*). Within the project area these wetlands are found along rivers and streams.

Emergent wetlands found within the project area are predominately mixed emergent marsh and cattail marsh. The mixed emergent marsh contains a mixture of bulrushes (*Scirpus* spp.), rushes (*Juncus* spp.), common reed grass (*Phragmites australis*) and umbrella sedges (*Cyperus* spp.). Some common herbs associated with this plant community include broad-leaved arrowhead (*Sagittaria latifolia*), swamp milkweed (*Asclepias incarnata*) and bulb-bearing water-hemlock (*Cicuta bulbifera*). The cattail emergent marsh is dominated by cattails (*Typha latifolia* and *Typha angustifolia*). Other species associated with this community include sedges (*Carex* spp.), swamp milkweed, marsh skullcap (*Scutellaria galericulata*) and jewel-weed. The cattail marsh has a peaty mat that develops over time, thus allowing the roots to grow without contact with the bottom.

The wetland acreage within the existing DM&E right-of-way in South Dakota, based on National Wetland Inventory (NWI) maps, is approximately 179.4 acres. NWI maps identify wetlands based on aerial photographs. They are intended as a guide in determining wetlands within a particular area. Table 4.1-7 provides the amount of wetlands within the existing DM&E right-of-way for each county.

Table 4.1-7
County Wetland Acreage

COUNTY	WETLAND TYPES (acres)				
	Emergent	Scrub/Shrub	Forested	Other	Total
BROOKING	3.5	0	0.0	0.1	3.6
KINGSBURY	22.4	0	0.2	1.5	24.1
BEADLE	9.5	0	0.1	2.5	12.1
HAND	3.6	0	0	0.1	3.7
HYDE	6.0	0	0	0	6.0
HUGHES	4.7	0	0.2	1.7	6.6
STANLEY	1.9	0	0	0.2	2.1
JONES	3.9	0	0.1	0.4	4.4
HAAKON	21.4	0.8	40.2	0.2	62.6
JACKSON	0.2	0.0	0.0	0.0	0.2
PENNINGTON (Wall east)	3.6	1.5	0.0	2.4	7.5
PENNINGTON* (Wall west)	10.6	1.9	0.1	14.7	27.3
CUSTER*	0.1	0.0	0.4	0.0	0.5

Table 4.1-7
County Wetland Acreage

COUNTY	WETLAND TYPES (acres)				
	Emergent	**Scrub/Shrub**	**Forested**	**Other**	**Total**
FALL RIVER*	10.9	0.0	0.0	7.8	18.7
TOTAL	**102.3**	**4.2**	**41.3**	**31.6**	**179.4**

* Wetlands along DM&E's existing rail line considered as part of one of the Extension Alternative to extend its rail line into the Powder River Basin.

4.1.5.4 Groundwater and Wells

4.1.5.4.1 Groundwater

Unconsolidated-Deposit aquifers - Brookings, Kingsbury, Beadle, Hand, Hyde and Hughes Counties

Sediments which make up the unconsolidated-deposit aquifers were deposited as outwash from glaciers and as alluvium from streams. Due to the wide variety of the sediments which make up these aquifers, there is a wide range of permeabilities. Sand and gravel deposited as a result of glacial outwash and stream alluvium generally have a high permeability. This high permeability allows surface water to pass downward through this aquifer and into the bedrock aquifers below. This is also a conduit for contamination to travel and pollute other aquifers. Fine-grained lake deposits and till typically have a much lower permeability.

Although some sand and gravel aquifers extend to the surface, many are buried, ancient stream deposits. These sediments were deposited in glacial meltwater streams or in valleys which cut into bedrock. These buried aquifers can be covered by confining units of clay or silt. These confining units, in turn, may be covered with sand and gravel as a result of glacial outwash. Many of the buried valley aquifers have been used as sources of freshwater. Wells screened in the sand and gravel lenses are sufficient for domestic use. Wells that are screened in the clay and silt may provide little or no water.

Lower Cretaceous aquifers

Lower Cretaceous aquifers extend over almost the entire State of South Dakota. These aquifers, however, appear at the land surface in wide to narrow bands. These exposed bands encircle basins or uplifted areas. These originally flat-lying rocks were warped into these structures by tectonic forces which acted on the earth's crust. Erosion has exposed many of these structures at the surface.

The lower Cretaceous aquifers are composed chiefly of consolidated sandstones. One of the most well known aquifers in the nation is the Dakota aquifer (locally called the Inyan Kara aquifer). This is part of the lower Cretaceous aquifer and is exposed on the flanks of the Black Hills Uplift in Pennington County. The Dakota aquifer extends more than 300 miles to the east under South Dakota. Because the water may move hundreds of miles in the subsurface, it is in contact with aquifer minerals for long periods of time. Water from the Dakota aquifer typically contains high concentrations of dissolved minerals.

Because the sandstones of the Dakota aquifer receive recharge (when water enters the aquifer) at high elevations, the water in the aquifer is under high artesian pressure. There is also upward leakage from deeper aquifers which contributes to the pressure.

Paleozoic aquifers - Hyde, Hughes, Stanley, Haakon, Pennington, and Fall River Counties

The Paleozoic aquifers extend from Hyde County west through Hughes, Stanley, Haakon, Pennington and Fall River counties. These aquifers, however, are exposed only in small areas. Paleozoic aquifers are composed mainly of limestone and dolomite, although some Paleozoic sandstone units produce water. Confining units that separate the aquifers consist of shale and siltstone with some beds of sandstone. Some confining units also contain anhydrite (a mineral used in the production of sulfuric acid) and halite (rock salt).

Recharge areas (locations where water enters the aquifer) of the Paleozoic aquifers are typically at high elevations. Paleozoic aquifers receive recharge where they are exposed at the land surface at the flanks or crests of anticlines (convex-upward folds in rocks or rock layers). Because of the high recharge elevation, the wells are under high artesian pressure and generally flow at the surface. Recharge is also received from shallower aquifers with water at a greater hydraulic head. Where the aquifers are buried at great depths, some limestone formations contain oil, gas and brine. Groundwater that moves near the margins of brines may become highly mineralized.

4.1.5.4.2 Wells

Unconsolidated-deposit aquifers - Brookings, Kingsbury, Beadle, Hand, Hyde and Hughes Counties

Unconsolidated-deposit aquifers in sediments of the Quaternary age are the most productive in central to eastern South Dakota and are the source of water for thousands of shallow wells. These aquifers typically consist of sand and gravel, but may contain local cobbles and boulders. Thickness of the unconsolidated deposits range from 0 to 400 feet. Clay and silt are often mixed with the sand and gravel or clay and silt lenses or beds are often present and may form local confining units. The unconsolidated-deposit aquifers are an important source of water, used for many purposes, in South Dakota.

Lower Cretaceous aquifers - Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Haakon, Pennington, Custer and Fall River Counties.

Wells must be drilled to great depths as the lower Cretaceous aquifers are usually deeply buried. Some wells are completed to depths greater than 5,000 feet. Well yields are typically between 5 and 60 gallons per minute. Some wells, however, exceed 500 to 1,000 gallons per minute.

Paleozoic aquifers - Hyde, Hughes, Stanley, Haakon, Pennington and Fall River Counties

The Madison Group consists of limestone altered by partial dissolution in many areas. The dissolution has resulted in many large solution cavities. Wells that penetrate such cavities may produce extremely large quantities of water, especially where several of the cavities are connected.

4.1.6 AIR QUALITY

The air quality in the project area in South Dakota is good. The Environmental Impact Statement for the Newcastle Resource Management Plan (BLM 1998) states that the air quality in east-central Wyoming is generally excellent. Based on similar land and level of development, air quality in the adjacent area of South Dakota would be similar to that of Newcastle, Wyoming.

Existing sources of emissions in the project area include the existing DM&E railroad locomotives, locomotives of the other rail carriers, automobiles, trucks and farm equipment. Vehicle traffic in the project area is responsible for tailpipe emissions including nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2). The primary pollutant produced by locomotives and farm equipment is NO_x. Farming and ranching activities and vehicles using unpaved roadways are sources of fugitive dust. There are also emissions created from manufacturing, construction and mining operations. However, these are minor in the South Dakota project area.

The Clean Air Act, which was last amended in 1990, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and buildings.

The EPA, Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six principle pollutants, which are called "criteria pollutants." They include: sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), lead (Pb) and particulate matter (PM). All South Dakota counties in the project area are in attainment for all criteria pollutants (sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, particulate matter) which means their concentrations are below NAAQS.

4.1.7 NOISE

The project area in South Dakota is primarily rural with rail, automobile and truck traffic, and farm equipment as the primary noise sources in the project area. The existing DM&E rail line is a source of rail noise in the communities where it currently exists and some communities, such as Wosley and Edgemont, also experience rail noise from other rail carriers. The DM&E track averages approximately 2-3 through trains per day, with additional rail traffic occurring irregularly in the form of wayfreight and switching operations. Table 4.1-8 lists the rail segments and approximate number of trains per day.

Table 4.1-8
Existing Rail Line - South Dakota
Train Traffic

Segments	Trains per day* (both ways)
Wall to Midland	1
Midland to Wolsey	2

Table 4.1-8
Existing Rail Line - South Dakota
Train Traffic

Segments	Trains per day* (both ways)
Wolsey to Huron	3
Huron to Arlington	3
Arlington to Brookings	4

* Includes wayfreights picking up and delivering rail cars to shippers.

Within the Extension Alternative portion of the project area are large tracts of land, including public lands such as National Grasslands. The majority of the existing noise that currently exists in these areas is generated from natural sources such as wind, rivers, and wildlife. Natural settings that lack the sounds of human activity are fast becoming a rare resource and one that is difficult to quantify in terms of value. Although there may be only a few permanent noise receptors in these regions, the introduction of noise from human activities such as highways and railroads significantly changes the complexion of the region for those who are attracted to the area to experience the solitude.

The existing DM&E rail line passes through numerous small communities. These communities are exposed to various types and levels of rail noise. Wayside noise includes the noise generated bya passing trains. Locomotive engine noise, rail noise and car noise contribute to wayside noise. Additionally, trains are required to sound a warning horn when approaching a public grade crossing. Horn soundings are required from 0.25 mile prior to a crossing until the locomotive passes through the grade crossing. Horn noise is significantly louder than wayside noise and is designed to provide adequate warning to motorists and pedestrians of an approaching train (Figure 4-1).

Noise sensitive receptors along a rail line may be exposed to one or both types of noise. Because horn noise is significantly louder than wayside noise, it extends further from the rail line and affects a greater number of noise receptors. The Surface Transportation Board (Board) considers residences, schools, libraries, hospitals, retirement and nursing homes as sensitive to noise and therefore considers these as noise sensitive receptors.

The following provides a brief profile for the communities along the existing DM&E rail line in South Dakota. The profiles include the segment of rail line, community, transportation and noise receptor information. Table 4.1-9 provides the number of noise sensitive receptors currently experiencing average daily noise levels of 65 decibels (dBA) or more (L_{dn} 65 contour) within each county and community. A summary of the public grade crossing information along the existing rail line is provided in Table 4.1-10.

Brookings Country

The existing DM&E rail line passes through approximately 0.5 mile of Elkton. The rail line trends southeast to northwest in the northern part of town. The rail line passes through approximately 4,200 feet of the major concentration of Elkton, including a commercial area. There are rail loading facilities in the community. The 1990 population of Elkton was 602. The public grade crossings in Elkton are Elk Street, North Buffalo Street, Cornell Avenue/County Road 33 and South Dakota Highway 13. The average daily traffic (ADT) of these crossings are 1,400, 250, 300 and 505, respectively. Elkton includes one high school, one middle school, three elementary schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 71.

The existing DM&E rail line passes through Aurora. The rail line trends southeast to northwest through the center of town. The rail line passes through approximately 0.7 mile of the major concentration of Aurora, passing through both commercial and residential areas. There are rail loading facilities within the community. The 1990 population of Aurora was 619. The public grade crossings in Aurora are Hull Avenue and Broadway Avenue/476th Avenue. The daily ADT of these crossings are 32 and 322, respectively. The community includes one high school, one middle school, three elementary schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 115.

The existing DM&E rail line in Brookings trends from southeast to northwest through the south area of town. The rail line passes through approximately three miles of the major concentration of Brookings, passing through both commercial and residential areas. There are rail loading facilities within the community. The 1990 population of Brookings was 16,270. The public grade crossings and ADTs are listed in Table 4.1-10. The community includes one high school, one middle school, three elementary schools, a college, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 736.

The existing DM&E rail line in Volga trends from east to west on the north edge of town. The rail line passes through approximately 4,800 feet of the major concentration of Volga, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Volga was 1,263. The public grade crossings in the community are Caspian Avenue, Hansina Street, Kasan Street and Samara Street. The ADTs of these crossings are 46, 375, 1,000 and 800, respectively. The community includes high schools, middle schools, elementary schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 99.

Kingsbury County

The existing DM&E rail line in Arlington trends from southeast to northwest through the northeastern half of town. The rail line passes through approximately 3,400 feet of the major concentration of Arlington, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Arlington was 908. The public grade crossings in the community are U.S. Highway 81, Main Street, North 3rd Street and North 4th Street. The ADTs of these crossings are 1,350, 630, 300 and 430, respectively. The community includes high schools, middle schools, elementary schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 93.

The existing DM&E rail line in Hetland trends from east to west through the center of town. The rail line passes through approximately 1,200 feet of the major concentration of Hetland, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Hetland was 53. The public grade crossing in the community is 449th Avenue/Main Street with an ADT of 118. The community includes a school and church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 23.

The existing DM&E rail line in Lake Preston trends from east to west on the north side of town. The rail line passes through approximately 3,400 feet of the major concentration of Lake Preston, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Lake Preston was 663. The public grade crossings in the community are Park Avenue, Lake Avenue, Main Street and Preston Avenue. The ADTs of these crossings are 408, 89, 2,496 and 86, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 94.

The existing DM&E rail line in De Smet trends from east to west through the northern part of town. The rail line passes through approximately 4,700 feet of the major concentration of De Smet, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of De Smet was 1,172. The public grade crossings in De Smet are Lyle Avenue, Calumet Avenue, State Highway 25, Sherwood, and Harvey Dunn. The ADTs of these crossings are 115, 390, 1,966, 186 and 130, respectively. The community includes schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 138.

The existing DM&E rail line in Manchester trends from east to west on the north side of town. The rail line passes through approximately 1,000 feet of the major concentration of Manchester, passing through residential areas. There are no rail loading facilities in the community. The 1990 population of Manchester was 136. There are no public grade crossings in the community. This community small includes a church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 19.

The existing DM&E rail line in Iroquois (Kingsbury and Beadle Counties) trends from east to west through the center of town. The rail line passes through approximately 3,000 feet of the major concentration of Iroquois, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Iroquois was 328. The public grade crossings in the community are Ottawa Street, Quapaw Street and 418th Avenue/Sioux Street. The ADTs of these crossings are 63, 230 and 157, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 20 in Kingsbury County and 20 in Beadle County.

Beadle County

The existing DM&E rail line in Cavour trends from east to west through the center of town. The rail line passes through approximately 2,400 feet of the major concentration of Cavour, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Cavour was 116. The public grade crossings in the community are 409th Avenue and 408th Avenue. The ADTs of these crossings are 188 and 15, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 20.

The existing DM&E rail line in Huron trends from east to west through the north part of town. The rail line passes through approximately 17,400 feet of the major concentration of Huron, passing through both commercial and residential areas. There are rail loading facilities in the community as well as DM&E's primary maintenance facility. The 1990 population of Huron was 12,448. The public grade crossings in Huron are Custer Avenue, Simons Avenue, Dakota Avenue, Lincoln Avenue, U.S. Highway 14, and West Park Avenue. The ADTs for these crossings are 45, 545, 11,030, 5,290, 2,137, and 125, respectively. The community includes high schools, middle schools, elementary schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 113.

The existing DM&E rail line in Wolsey trends from southeast to northwest through the north part of town. The rail line passes through approximately 3,200 feet of the major concentration of Wolsey, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Wolsey was 442. The public grade crossings in the community are Commercial Avenue, Highway 281, Highway 14 and 387th Avenue. The ADTs of these crossings are 0, 270, 200 and 0, respectively. This community includes schools and churches. Noise sensitive receptors in the 65 dBA L_{dn} contour number 38.

The existing DM&E rail line in Wessington (Beadle and Hand Counties) trends from southeast to northwest through the center of town. The rail line passes through approximately 3,700 feet of the major concentration of Wessington, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Wessington was 265. The public grade crossings in the community are Wessington Street and 374th Avenue. The ADTs of these crossings are 952 and 464, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 29 in Beadle County and one in Hand County.

<u>Hand County</u>

The existing DM&E rail line in Vayland trends from southeast to northwest along the northeast side of the community. The rail line passes through approximately 1,200 feet of this residential area. There are no rail loading facilities in the community. Vayland is very small and population information was not available. This community includes a school. Noise sensitive receptors in the 65 dBA L_{dn} contour number 4.

The existing DM&E rail line in St. Lawrence trends from east to west through the south part of town. The rail line passes through approximately 3,000 feet of the major concentration of St. Lawrence, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of St. Lawrence was 223. The public grade crossings in the community are Maple Street and Commercial Avenue. The ADTs of these crossings are 164 and 166, respectively. This community includes a school and a church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 16.

The existing DM&E rail line in Miller trends from east to west through the south part of town. The rail line passes through approximately 4,500 feet of the major concentration of Miller, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Miller was 1,678. The public grade crossings in the community are 3rd Street, Broadway/Highway 47 and 3rd Avenue West. The ADTs of these crossings are 400, 2,505 and 204, respectively. The community includes schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 75.

The existing DM&E rail line in Ree Heights trends from east to west through the northern part of town. The rail line passes through approximately 2,100 feet of the major concentration of Ree Heights, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Ree Heights was 91. The public grade crossings in the community are Dakota Avenue and Lincoln Avenue. The ADTs of these crossings are 508 and 5, respectively. This community includes a school and a church. Noise sensitive receptors in the 65 dBA L_{dn} contour number 9.

Hyde County

The existing DM&E rail line in Highmore trends from east to west through the northern part of town. The rail line passes through approximately 4,000 feet of the major concentration of Highmore, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Highmore was 835. The public grade crossings in the community are Commercial and Iowa Avenue. The ADTs of these crossings are 272 and 1,543, respectively. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 24.

The existing DM&E rail line in Holabird trends from east to west through the center of this community. The rail line passes through approximately 300 feet of this populated place, passing through both commercial and residential areas. There are no rail loading facilities in the community. Holabird is a very small populated place and population information was not available. The public grade crossings in the community are Oak Street and 328th Avenue/County Road 649. The ADTs of these crossings are 21 and 95, respectively. This community includes a school. There are no noise sensitive receptors in the 65 dBA L_{dn} contour.

Hughes County

The existing DM&E rail line in Harrold trends from east to west through the northern part of town. The rail line passes through approximately 2,700 feet of the major concentration of Harrold, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Harrold was 167. The public grade crossings in the community are Wyman Avenue and 321st Avenue. The ADTs of these crossings are 300 and 151, respectively. This community includes schools and churches. Noise sensitive receptors in the 65 dBA L_{dn} contour number 26.

The existing DM&E rail line in Blunt trends from northeast to the south along the southwestern side of town. The rail line passes through approximately 1,800 feet of the major concentration of Blunt, passing through a commercial area. There are rail loading facilities in the community. The 1990 population of Blunt was 342. The public grade crossings in the community are 309th Avenue and Canning Road. The ADTs of these crossings are 9 and 153, respectively. Noise sensitive receptors in the 65 dBA L_{dn} contour number 15.

The existing DM&E rail line in Canning trends from northeast to southwest through the center of this community. The rail line passes through approximately 1,200 feet of this community. There are no rail loading facilities in Canning. No population information was available for Canning. Noise sensitive receptors in the 65 dBA L_{dn} contour number 7.

The existing DM&E rail line in Alto trends from east to west through the south part of town. The rail line passes through approximately 1,200 feet of the major concentration of Alto, passing through both commercial and residential areas. There are no rail loading facilities in the community. The 1990 population of Alto was 83. There are no noise sensitive receptors in the 65 dBA L_{dn} contour.

The existing DM&E rail line in Pierre trends from southeast to northwest through the southern part of town. The rail line passes through approximately 26,000 feet of the major concentration of Pierre, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Pierre was 12,906. The public grade crossings and ADTs are listed in Table 4.1-10. The community includes schools, churches, parks, and the state capital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 258.

Stanley County

The existing DM&E rail line in Ft. Pierre trends from north to south through the center of town. The rail line passes through approximately 23,500 feet of the major concentration of Ft. Pierre, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Ft. Pierre was 1,854. The public grade crossings and ADTs are listed in Table 4.1-10. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 96.

The existing DM&E rail line trends generally northeast to southwest through the center of the small community of Wendte in Stanley County. The rail line passes through approximately 600 feet of Wendte. There are not rail loading facilities in this community. This is a very small community and population information was not available. Noise sensitive receptors within the 65 dBA L_{dn} contour in Wendte number 2.

Haakon County

The existing DM&E rail line in Midland trends from east to west along the south side of the town. The rail line passes through approximately 5,000 feet of the major concentration of Midland, passing through a commercial area. There are rail loading facilities in the community. The 1990 population of Midland was 233. The public grade crossing in the community is Highway 63 with an ADT of 280. The community includes schools, churches and parks. Noise sensitive receptors in the 65 dBA L_{dn} contour number 25.

The existing DM&E rail line in Nowlin trends from east to west along the south edge of this community. The rail line passes through approximately 1,100 feet of this populated place. There are no rail loading facilities in the community. Nowlin is a very small populated place and population information was not available. Nowlin has no public grade crossings, and no noise sensitive receptors in the 65 dBA L_{dn} contour.

The existing DM&E rail line in Powell trends from northeast to southwest along the north side of town. There are no rail loading facilities in the community. The 1990 population of Powell was 37. Powell has no public grade crossings, and no noise sensitive receptors in the 65 dBA L_{dn} contour.

The existing DM&E rail line in Philip trends from northeast to southwest through the south part of town. The rail line passes through approximately 4,600 feet of the major concentration of Philip, passing through both commercial and residential areas. There are rail loading facilities in the community. The 1990 population of Philip was 1,077. The public grade crossing in the community is Highway 73 with an ADT of 615. The community includes schools, churches, parks, and a hospital. Noise sensitive receptors in the 65 dBA L_{dn} contour number 28.

Jackson County

The existing DM&E rail line in Cottonwood trends from east to west through the south part of the town. The rail line passes through approximately 400 feet of the major concentration of Cottonwood. There are no rail loading facilities in the community. The 1990 population of Cottonwood was 12. The public grade crossing in the community is Highway 14 with an ADT of 1,020. Noise sensitive receptors in the 65 dBA L_{dn} contour number 4.

Pennington County

The existing DM&E rail line in Quinn trends from southeast to northwest along the south part of town. The rail line passes through approximately 3,200 feet of the major concentration of Quinn. There are rail loading facilities in the community. The 1990 population of Quinn was 72. Noise sensitive receptors in the 65 dBA L_{dn} contour number 8.

The existing DM&E rail line in Wall trends from northeast to southwest through the eastern part of town. The rail line passes through approximately 3,200 feet of the major concentration of Wall. There are rail loading facilities in the community. The 1990 population of Wall was 834. The public grade crossings in the community are 4th Street and Business Loop East. The ADTs of these crossings are 1,658 and 1,550, respectively. Noise sensitive receptors in the 65 dBA L_{dn} contour number 13.

The existing DM&E rail line in Wasta trends from northeast to southwest through the eastern part of town. The rail line passes through approximately 2,200 feet of the major concentration of Wasta. There are rail loading facilities in the community. The 1990 population of Wasta was 82. There are no public grade crossings in Wasta. Noise sensitive receptors in the 65 dBA L_{dn} contour number 16.

The existing rail line in Owanka trends east to west through the southern part of town. Population information for Owanka was not available. Owanka Road is the only public grade crossing in the community. The ADT for Owanka Road is 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 3.

The existing rail line in New Underwood trends east to west through the southern part of town. The 1990 population of New Underwood was 565. Underwood South is the only public grade crossing in the community. Underwood South has an ADT of 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 10.

The existing rail line in Box Elder trends east to west through the center of town. The 1990 population of Box Elder was 2,680. There are 4 public grade crossings in the community. These include Spruce Drive, Cottonwood Drive, Cedar Street, and Cobler Road. The ADTs for all of these crossings are 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 18.

The existing rail line in Rapid City trends northeast to southwest into the city and then trends northwest to southeast leaving the city. The 1990 population of Rapid City was 54,523. Public grade crossings and their ADTs are listed in Table 4.1-10. Noise sensitive receptors in the 65 dBA L_{dn} contour number 205.

The existing rail line in War Bonnett trends northwest to southeast through town. Population information was not available for War Bonnett. There are no public grade crossings in the community. Noise sensitive receptors in the 65 dBA L_{dn} contour number 8.

The existing rail line in Ajax trends northeast to southwest through town. Population information was not available for Ajax. Daughenbaugh Road is the only public grade crossing in the community. The ADT for Daughenbaugh Road is 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 1.

Custer County

The existing rail line in Hermosa trends northeast to southwest on the east side of town. The 1990 population of Hermosa was 242. U.S. Highway 40 and Vilas Road are the only public grade crossings in the community. The ADTs for these crossings are 2,122, and 40 respectively. Noise sensitive receptors in the 65 dBA L_{dn} contour number 10.

The existing rail line in Fairburn trends northeast to southwest in the northern part of town. The 1990 population of Fairburn was 65. There are no public grade crossings in the community. Noise sensitive receptors in the 65 dBA L_{dn} contour number 2.

The existing rail line in Buffalo Gap trends north to south through the eastern part of town. The 1990 population of Buffalo Gap was 173. The only public grade crossing in the community is County Road (CR) 656. Noise sensitive receptors in the 65 dBA L_{dn} contour number 11.

Fall River County

The existing rail line in Oral trends north to south through the eastern part of town. The 1990 population of Oral was 25. CR 2 is the only public grade crossing in the community. This crossing has an ADT of 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 12.

The existing rail line in Smithwick trends north to south on the west side of town. The 1990 population of Smithwick was 15. CR 1 is the only public grade crossing in the community. This crossing has an ADT of 100. Noise sensitive receptors in the 65 dBA L_{dn} contour number 4.

The existing rail line through Heppner trends northeast to southwest through the community. Population information was not available for Heppner. There are no public grade crossings. Noise sensitive receptors in the 65 dBA L_{dn} contour number 1.

The proposed rail line in Edgemont trends southeast to northwest along the northeast side of the city. The 1990 population of Edgemont was 908. The public grade crossings in the community are County Highway 6E, Old U.S. Highway 18 and Old U.S. Highway 18. No ADT information is available for these crossings. Burlington Northern Santa Fe Railway (BNSF) currently owns and operates trackage through Edgemont.

Table 4.1-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors-65 dBA L_{dn}

County and Communites	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**107**	**949**	**1,056**
Elkton	0	0	71	71
Aurora	0	6	109	115
Brookings	0	100	636	736
Volga	0	0	99	99
RURAL	0	1	34	35
Kingsbury	**0**	**0**	**395**	**395**
Arlington	0	0	93	93
Hetland	0	0	23	23
Lake Preston	0	0	94	94
De Smet	0	0	138	138
Manchester	0	0	19	19
Iroquois	0	0	19	20
RURAL	0	0	9	8
Beadle	**0**	**1**	**229**	**230**
Iroquois	0	0	20	20
Cavour	0	0	20	20
Morningside	0	0	0	0
Huron	0	1	112	113
Wolsey	0	0	38	38
Wessington	0	0	29	29
RURAL	0	0	10	10
Hand	**0**	**3**	**105**	**108**
Wessington	0	0	1	1
Vayland	0	0	4	4
St. Lawrence	0	1	15	16
Miller	0	2	73	75
Ree Heights	0	0	9	9
RURAL	0	0	3	3
Hyde	**0**	**0**	**26**	**26**
Highmore	0	0	24	24
Holabird	0	0	0	0
RURAL	0	0	2	2

Table 4.1-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors-65 dBA L_{dn}

County and Communites	Wayside	Wayside/horn	Horn	Total
Hughes	**0**	**0**	**308**	**308**
Harrold	0	0	26	26
Blunt	0	0	15	15
Canning	0	0	7	7
Alto	0	0	0	0
Pierre	0	0	258	258
RURAL	0	0	2	2
Stanley	**0**	**0**	**105**	**105**
Ft. Pierre	0	0	96	96
Wendte	0	0	2	2
RURAL	0	0	7	7
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
RURAL	0	0	0	0
Haakon	**0**	**0**	**53**	**53**
Midland	0	0	25	25
Nowlin	0	0	0	0
Powell	0	0	0	0
Philip	0	0	28	28
Jackson	**0**	**1**	**3**	**4**
Cottonwood	0	1	3	4
Pennington	**0**	**4**	**272**	**276**
Quinn	0	1	8	8
Wall	0	1	12	13
Wasta	0	2	14	16
Owanka	0	0	3	3
New Underwood	0	0	10	10
Box Elder	0	0	19	19
Rapid City	0	0	205	205
War Bonnett	0	0	0	0
Ajax	0	0	1	1
RURAL	0	0	0	0

Table 4.1-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors-65 dBA L_{dn}

County and Communites	Wayside	Wayside/horn	Horn	Total
Custer	**0**	**1**	**22**	**23**
Hermosa	0	1	9	10
Fairburn	0	0	2	2
Buffalo Gap	0	0	11	11
Fall River	**0**	**1**	**15**	**16**
Oral	0	1	11	12
Smithwick	0	0	4	4

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Brookings	Elkton	southeast to northwest in the northern part of town	602	Elk Street North Buffalo Street Cornell Avenue/CR 33 SD Highway 13	1,400 250 300 505	71
	Aurora	southeast to northwest through the center of town	619	Hull Avenue Broadway Avenue/476 Avenue	32 322	115
	Brookings	southeast to northwest through the south part of town	16,270	22nd Avenue 17th Avenue Medary Avenue Main Avenue Western Avenue 6th Street West 16th Avenue West	12,703 3,025 6,440 7,988 2,630 206 68	736
	Volga	east to west on the north edge of town	1,263	Caspian Hansina Street Kasan Street Samara Street	46 375 1,000 800	99

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Kingsbury	Arlington	southeast to northwest	908	U.S. Highway 81 Main Street North 3rd Street North 4th Street	1,350 630 300 430	93
	Hetland	east to west through the center of town	53	449th Avenue/Main Street	118	23
	Lake Preston	east to west on the north side of town	663	Park Avenue Lake Avenue Main Street Preston Avenue	408 89 2,496 86	94
	De Smet	east to west through the northern part of town	1,172	Lyle Avenue Calumet Avenue Highway 25 Sherwood Harvey Dunn	115 390 1,966 186 130	138
	Manchester	east to west on the north side of town	136	none		19
Kingsbury/ Beadle	Iroquois	east to west through the center of town	328	Ottawa Street Quapaw Street 418th Avenue/Sioux Street	63 230 157	40

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Beadle	Cavour	east to west through the center of town	116	409th Avenue 408th Avenue	188 15	20
	Huron	east to west through the north part of town	12,448	Custer Avenue Simons Avenue Dakota Avenue Lincoln Avenue U.S. Highway 14 West Park Avenue	45 545 11,030 5,290 2,137 125	113
	Wolsey	southeast to northwest through the north part of town	442	Commercial Avenue/Highway 281/Highway 14 387th Avenue	270 200	38
Beadle/ Hand	Wessington	southeast to northwest through the center of town	265	Wessington Street 374th Avenue	952 464	29
Hyde	Vayland	southeast to northwest along the northeast side of this community	Not available	none		4
	St. Lawrence	east to west through the south part of town	223	Maple Street Commercial Avenue	164 166	16

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Hand	Miller	east to west through the south part of town	1,678	3rd Street Broadway/Highway 47 3rd Avenue West	400 2,505 204	75
	Ree Heights	east to west through the northern part of town	91	Dakota Avenue Lincoln Avenue	508 5	9
Hughes	Harrold	east to west through the northern part of town	167	Wyman Avenue 321st Avenue	300 151	26
	Blunt	northeast to the south along the southwestern side of town	342	309th Avenue Canning Road	9 153	15
	Canning	northeast to southwest through the center of the community	Not available	none		7
	Alto	east to west through the south part of town	83	none		none
	Pierre	southeast to northwest through the southern part of town	12,906	Lowell Road Industrial Harrison Monroe Highway 14/34 Ree Street Highland Avenue Central Street Poplar	213 3,798 100 1,560 19,755 1,020 6,045 6,365 1,149	258

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Stanley	Ft. Pierre	north to south through the center of town	1,854	Highway 14/34 Stanley Road Seventh Avenue Fifth Avenue Second Avenue Main Avenue Park	3,500 50 392 211 756 3,136 406	96
	Wendte	northeast to southwest through the center of the community	Not available	none		2
Haakon	Midland	east to west along the south side of the town	233	Highway 63	280	25
	Nowlin	east to west along the south edge of the community	Not available	none		none
	Powell	northeast to southwest along the north side of town	37	none		none
	Philip	northeast to southwest through the south part of town	1,077	Highway 73	615	28
Jackson	Cottonwood	east to west through the south part of town	12	Highway 14	1,020	4
Pennington	Quinn	southeast to northwest along the south part of town	72	none		8
	Wall	northeast to southwest through the eastern part of town	834	4th Street Business Loop East	1,658 1,550	13
	Wasta	northeast to southwest through the eastern part of town	82	none		16
	Owanka	east to west through southern part of town	N/A	Owanka Road	100	3

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Pennington	New Underwood	east to west through the southern part of town	565	Garrett Road	100	10
	Box Elder	east to west through the center of town	2,680	Spruce Drive	100	18
				Cottonwood Drive	100	
				Cedar Street	100	
				Cobler Road	100	
	Rapid City	northeast to southwest into the city, then northwest to southeast out of city.	54,523	Elgin Street	100	205
				I-16t	100	
				Century Road	100	
				North Lacrosse Road	100	
				Milwaukee Street	100	
				Maple Avenue	1,493	
				East Boulevard, North	100	
				New York Street	956	
				Omaha Street	2,600	
				2nd Street	2,272	
				1st Street	4,880	
				East Boulevard	16,500	
				Maple Avenue	7,891	
				Steele Avenue	516	
				East St. Charles Street	392	
				East St. Patrick Street	12,734	
	War Bonnett	northwest to southeast through town	not available	none	n/a	8
	Ajax	northeast to southwest through town	not available	Daughenbaugh Road	100	1

Table 4.1-10
Summary Information for South Dakota Communities along the Existing DM&E Rail Line

County	Community	Rail Line Location	Community Population (1990)	Public Grade Crossings	ADT	Noise Sensitive Receptors [1]
Custer	Hermosa	northeast to southwest through t0wn	242	U.S. Highway 40 Vilas Road	2,122 40	10
	Fairburn	northeast to southwest in the northern part of town	65	none	n/a	2
	Buffalo Gap	north to south through the eastern part of town	173	County Road 656	65	11
Fall River	Oral	north to south through the eastern part of town	25	County Road 2	100	12
	Smithwick	north to south through the western part of town	15	County Road 1	100	4
	Heppner	northeast to southwest through town	not available	none	n/a	1

[1]Noise sensitive receptors in the 65 dBA L_{dn} contour

4.1.8 BIOLOGICAL RESOURCES

4.1.8.1 Vegetation

The project area of South Dakota is located in the Great Plains Prairie Ecological Region. Most of the project area is dominated by a mixed short and tall grass prairie. However, pockets of short grass prairie are found in eastern South Dakota. The extreme eastern part of the project area is located within the historic range of the tallgrass prairie. Containing some of the most fertile soils in the world, the tallgrass prairie has been heavily converted to agriculture. This has resulted in the loss of native prairie vegetation in many of the eastern South Dakota counties.

From the Missouri River west, in areas where large scale grazing occurs, the grasslands are composed predomimately of short grass species. In areas where land management does not include grazing, medium tall grasses tend to be dominate. These grasses can be found on hilly, medium-textured soils. Wheat (*Elymus smithii*) and needle grass (*Stipa viridula*) are the major cover forming grasses found in this region. Other grass species found in this area include blue grama (*Bouteloua gracilis*), little bluestem *(Andropogon scoparium)*, buffalo grass (*Buchloe dactyloides*) and side-oats grama (*Boutelova curtipendula*). This mixture of short-and mid-grasses makes for a diverse forb community. Some common forbs found in this prairie include pasque flower (*Anemone patens*), prairie golden aster (*Heterotheca villosa*), dotted blazing star (*Liatris punctata*), stiff sunflower (*Helianthus rigidus*), silky aster (*Aster sericeus*), prairie smoke (*Geum triflorum*) and tooth-leaved evening primrose (*Calyophus serrulatus*).

Short grass prairie is dominated by grama and buffalo grass. Forbs found in the short grass prairie include white aster (*Aster ericoides*), beardtongue (*Penstemon* spp.), purple coneflower (*Echinacea angustifolia*), bluebells (*Mertensia* spp.), silver-leaf scurf pea (*Psoralea agrophylla*) and goldenrod (*Solidago* spp.).

In the early 1900's, uncontrolled livestock grazing and drought conditions on mixed- and short-grass prairie contributed to extensive rangeland degradation. Under improper management rangeland can experience a decrail line in native grass species and increased invasion of annuals. Some of the annuals likely to encroach on rangeland due to poor management practices include Russian thistle (*Salsola* spp.), brome (*Bromus* spp.), barley (*Hordeum* spp.) and fescue (*Fetuca* spp.). In addition, weeds such as snakeweed (*Gutierrezia* spp.) and prickly pear (*Opuntia* spp.) will increase in overgrazed prairie. Improved range management techniques have helped reverse the trend of degraded rangeland in South Dakota. Today, grazing conditions on rangeland managed by the USFS and BLM are generally good and in a stable and upward trend.

The practice of fire suppression has also altered the grass species composition of the mixed grass prairie; as grama, buffalograss and dropseed (*Sporobolus heterolepis*) have been replaced by species less tolerant of fire such as wheatgrass, bentgrass (*Argrostis* spp.) and brome.

Central South Dakota, the Missouri River to the James River, is a transition zone between the drier western prairie and the normally wetter eastern part of the state. Grasses found in this region can be characterized by a mixture of short and medium-tall grasses. Wheat grass, little bluestem and needle grass are the dominate grass species found in this geographic area. Other grass species found in this region include porcupine grass (*Stipa spartea*) and sand dropseed (*Sporobolus cryptandrus*). A diverse forb composition is also found in this zone. Some common forbs found in this region include buffalo-bean or ground plum (*Astragalus crassicarpus*), heartleaved alexanders (*Zizia aptera*), purple prairie clover (*Dalea purpurea*), hoary puccon (*Lithospermum canescens*) and prairie larkspur (*Delphinium virescens*).

The eastern part of South Dakota generally receives more moisture, thus tallgrass prairie species are more common. Tallgrass prairie soil is characterized by a rich, dark layer. Grass species that dominate this plant community include big bluestem (*Andropogon gerardii*) and little bluestem, Indian grass (*Sorghastrum nutans*) and switch grass (*Panicum virgatum*). Some common forb species found in this plant community include purple prairie clover, ground plum, smooth rattlesnake root (*Prenanthes racemosa*), purple coneflower, prairie bird-foot violet (*Viola pedatifida*) and prairie larkspur.

Riparian shrub and forest areas occur along floodplains of larger rivers within the South Dakota project area. Native tree and shrub species that occur in these forests include plains cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*), sandbar willow (*Salix exigua*), American elm (*Ulmus americana*), American plum (*Prunus americanus*), box elder (*Acer negundo*), common chokecherry (*Prunus virginiana*), green ash (*Fraxinus pennsylvanica*), silver buffaloberry (*Shepherdia argentea*) and western snowberry (*Symphoricarpos occidentalis*). In the western part of the project area, ponderosa pine (*Pinus ponderosa*) and juniper (*Juniperus* spp.) occur in forest habitat. These riparian and forest areas provide habitat for a variety of wildlife species in the project area.

Agriculture and the businesses and industries that support agriculture represent a significant part of the economy in South Dakota. Cultivated crops such as corn, sunflowers, oats, winter wheat, grain sorghum, soybeans, and alfalfa make-up the major crops on agricultural land in the project area. The counties in eastern and central South Dakota produce higher volumes of crops, based on statistics from the South Dakota Department of Agriculture. Western counties in the project area, such as Fall River and Custer, produce lesser amounts of the state's crops. The existing DM&E rail line is adjacent to approximately 303.0 miles of cropland in South Dakota.

Along with crop production, livestock and poultry represent a large portion of the agricultural business in South Dakota. Sections of land in the project area are used for pasture, and holding areas for sheep, cattle, and hogs. Much of the pasture forage is native grasses such as blue gramma grass, western wheatgrass, big sagebrush, needle grasses, June grass as well as many species of forbs. The general conditions of the rangeland in South Dakota is considered good and in an upward trend. This is compared to conditions in the early 1900's where unregulated livestock grazing and drought on range lands had contributed to declining quality of rangeland (PIC Technologies 2000).

4.1.8.2 Wildlife

4.1.8.2.1 Big Game

Mule Deer

Mule deer (*Odocoileus hemionus*) live in a wide variety of prairie, brushland, desert or mountain habitats and may be found in the proposed project area in western and central South Dakota (Stevens 1992b).

White-tailed Deer

White-tailed deer (*Odocoileus virginianus*) are the most common big game animal in North America. White-tailed deer are found in a varaity of habitats including cultivated cropland. They occur throughout South Dakota in the proposed project area (Stevens 1992b).

Pronghorn Antelope

Pronghorn antelope (*Antilocapra americana*) are mainly forb and browse eaters, feeding especially on sagebrush and may be found in the proposed project area in suitable habitat west of the Missouri River (Stevens 1992b).

Wild Turkey

Wild turkeys (*Meleagris gallopavo*) are considered a big game animal in South Dakota. Turkeys prefer wooded habitat with scattered openings. They are found in the south central and and western portions of South Dakota. Wild turkey are hunted in the spring and fall.

4.1.8.2.2 Game Species

Upland Birds

Upland game birds common to South Dakota include: ring-necked pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), sharp-tailed grouse (*Tympanuchus phasianellus*), Greater Prairie-Chicken (Tympanuchus cupido), and mourning dove (*Zenaida macroura*). Ringed-necked pheasant are also found throughout South Dakota. Gray partridges seem to prefer farmed prairies and are found throughout much of South Dakota. Sharp-tailed grouse occur in grasslands with brush or sagebrush, open woodland, cutover areas with low brush, or immature forests and are found throughout South Dakota except for the southeastern corner of the state. In South Dakota, sharp-tailed grouse and prairie chickens are hunted together without distinction between the two species. Mourning doves occur in residential and rural areas and are found throughout South Dakota (Stevens 1992a). The sage prairie in parts of extreme west South Dakota is the eastern limit of several western species, including the sage grouse (Ashton & Dowd).

Waterfowl

The Central Flyway covers southeastern and central South Dakota. In the fall, migrating waterfowl travel across South Dakota to reach suitable wintering grounds. When spring arrives these birds start the same journey back north to their respective breeding grounds. Some common species found using the Central Flyway include: mallards (*Anas platyrhynchus*), Northern pintails (*Anas acuta*), Northern shovelers (*Anas clypeata*), gadwalls (*Anas strepera*), American wigeons (*Anas americana*), blue-winged teals (*Anas discors*), green-winged teal (*Anas crecca*), canvasbacks (*Aythya valis ineria*), redheads (*Aythya americana*), buffleheads (*Bucephala albeola*), common goldeneyes (*Bucephala clangula*), ruddy ducks (*Oxyura jamaicensis*), hooded mergansers (*Lophodytes cucullatus*), common mergansers (*mergus merganser*), trumpeter swans (*Cygnus buccinator*), tundra swans (*Cygnus columbianus*) and Canada geese (*Branta canadensis*) (Braaten 1993). Waterfowl use seasonal and permanent wetlands, streams, ponds and rivers throughout the project area for rearing young, breeding, resting, feeding and roosting. During migrations, they may utilize the forage provided in agricultural fields. Vegetated wetlands and upland grasslands, pastures and agricultural fields are used in the spring for nesting.

Small Game and Furbearers

Cottontail rabbit (*Sylvilagus floridanus*), blacktail jackrabbit (*Lepus californicus*), Eastern fox squirrel (*Sciurus niger*), thirteen-rail lined ground squirrel (*Citellus tridecemrail lineatus*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethica*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon loter*), badger (*Taxidra taxus*), mink (*Mustela vison*), long-tailed weasel (*Mustela frenata*), short-tailed weasel (*Mustela erminea*) and least weasel (*Mustela rixosa*) are some of the small game and furbearers found in the project area. The cottontail is usually found in suburban areas. Jackrabbits are found in pastures and croplands. Fox squirrels prefer small forest habitats, gray squirrels prefer mature, dense forests and ground squirrels prefer prairie habitats. Beaver and muskrat are found along waterways and in a variety of wetland habitats. Bobcats occur in a variety of habitat types, from forest to desert. Coyote are extremely adaptable and can be found in both rural and suburban areas. Red fox prefer rolling farmlands; grey fox prefer small wooded areas with brush understories and rock outcrops. Raccoon are found in areas where they have ready access to fresh- or salt-water. Badgers are distributed in treeless habitats across the western and northcentral United States. Mink use a variety of wetland habitats, including streams, lakes and marshes. Weasels seem to prefer boreal habitats that may include agricultural land, woodlands, and meadows (McCabe & Williamson 1995).

The mountain lion (*Felis concolor*) is a state threatened species that is found in sparsely populated areas of the Black Hills and western South Dakota. Mountain lion habitat varies from pine forest to rocky badlands. Mountain lions are most abundant in areas where deer populations are plentiful, but their numbers are not high even in these areas. In South Dakota, populations estimates of mountain lions range from 15 to 25 in the Black Hills, and 15 to 25 on the West River Prairie.

The river otter (*Lutra canadensis*) is state threatened and is found in rivers, ponds, lakes and unpolluted waters in wooded areas. Key habitat components are riparian vegetation, temporary den and resting sites and adequate food. In South Dakota, it has been reported from Hughes County along the Missouri River (Ashton & Dowd 1994).

The Swift Fox (*Vulpes velox*) is state threatened and is a candidate for Federal listing. This fox inhabits open prairies, plains and shrubby desert areas away from extensively cultivated land. In South Dakota, swift fox prefer short- to mid-grass prairies. Swift fox have been reported from Stanley and Haakon counties in the proposed project area (Ashton & Dowd 1994). Swift fox are discussed in more detail in Section 4.1.8.4 in the Biological Assessment, Appendix K.

4.1.8.2.3 Non-game Species

Amphibians

South Dakota has few amphibians. The eastern tiger salamander (*Ambystoma tigrinum*) occurs in the eastern corner of the state. The blotched tiger salamander (*Ambystoma tigrinum melanostictum*) occurs in western and central South Dakota. The Western chorus frog (*Pseudacris triseriata*), boreal chorus frog (*Pseudacris triseriata maculata*) and the Northern leopard frog (*Rana pipiens*) may also occur in the proposed project area. Amphibians are generally found associated with wetlands throughout the project area.

Reptiles

The following species of snakes may be found in the proposed project area and are protected in South Dakota or of special concern: the rail lined snake (*Tropidoclonion rail lineatum rail lineatum*) is state endangered, the eastern hognose snake (*Heterodon platyrhinos*) is state threatened, and the red milk (*Lampropeltis triangulum syspila*) and northern redbelly snakes (*Storeria occipitomaculata occipitomaculata*) are species of special concern. Plains garter snake (*Thamnophis radix haydeni*) and common garter snake (*Thamnophis sirtalis*) are found throughout South Dakota in open grassland areas near wetlands. The pale milk snake (*Lampropeltis triangulum multistrata*) is found in the counties adjacent to and west of the Missouri River in open prairies, sand dunes and rocky hillsides near water sources. The redbelly snake (*Storeria occipitomaculata*) is found in extreme eastern South Dakota in the proposed project area in woodland areas and moist grassy meadows. The plains hognose snake (*Heterodon nasicus nasicus*) is found statewide in prairies with sand or gravel and floodplains. The racer (*Coluber constrictor flaviventris*) is found in the counties adjacent to the Missouri River in central South Dakota and all counties in western South Dakota in open grassland, pasture and prairie areas. The bullsnake (*Pituophis melanoleucus sayi*) is found in counties in the western two-thirds of South Dakota in open grasslands. The prairie rattlesnake (*Crotalus viridis viridis*) is found in counties along the eastern side of the Missouri River and all counties in western South Dakota in open prairies, haylands and even croplands.

The Western spiny softshell turtle (*Trionyx spinifer harwegi*) , a state threatened species, is found on mud flats, sandbars and soft, sandy or muddy bottoms with some aquatic vegetation in lakes, reservoirs, fast-flowing rivers, ponds along rivers, and intermittent streams. There are records from Lyman County in the proposed project area (Ashton & Dowd 1994). The false map turtle (*Graptemys pseudogeographica pseudogeographica*) is state threatened and inhabits slow-moving rivers, river sloughs, oxbow lakes, lakes and reservoirs containing abundant aquatic vegetation and basking sites. The turtle may be found in the Missouri River Drainages. South

Dakota is on the northwestern edge of its range, with reports from Hughes County in the proposed project area (Ashton & Dowd 1994).

Songbirds

Since most of South Dakota is in the northern Great Plains, grassland birds are predominant and conspicuous across the state. The most conspicuous species in dry grasslands is the Western meadowlark which breeds in every county of the state. Other widely distributed nesting species throughout the state include the killdeer (*charadrius vociferus*), common nighthawk (*Chordeiles minor*), horned lark (*Eremophila alpestris*), dickcissel (*Spiza americana*), vesper sparrow (*Pooecetes gramineus*), lark sparrow (*Chondestes grammacus*), lark bunting (*Calamospiza melanocorys*), grasshopper sparrow (*Ammodramus savannarum*) and chestnut-collared longspur (*Calcarius ornatus*).

Where trees occur, either naturally in stream bottoms or in planted shelterbelts, the northern flicker (*Colaptes auratus*), Western (*Tyrannus verticalis*) and Eastern kingbirds (*Tyrannus tyrannus*), American crow (*Corvus brachyrhynchos*), black-capped chickadee (*Parus atricapillus*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carorail linensis*), brown thrasher (*Toxostoma rufrum*), yellow warbler (*Dendroica petechis*), American redstart (*Setophaga ruticilla*), rufous-sided towhee (*Pipilo erythrophthalmus*), common grackle (*Quiscalus quiscula*) and orchard oriole (*Icterus spurius*) may be found. Some deciduous forest species that reach their western limit in the eastern part of South Dakota include the American woodcock (*Scolopax minor*), ruby-throated hummingbird (*Archilochus colubris*), yellow-bellied sapsucker (*Sphyrapicus varius*) and yellow-throated vireo (*Vireo flavifrons*). Important nesting species in more urban habitats include the chimney swift (*chaetura pelagica*), red-headed woodpecker (*Melanerpes erythrocephalus*), downy woodpecker (*Picoides pubescens*), Northern flicker (*Colaptes auratus*), purple martin (*Progne subis*) (mostly east of the Missouri River), blue jay (*cyanocitta cristata*), American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), Northern oriole (*Icterus spurius*), common grackle (*Quiscalus quiscula*), Northern cardinal (*Cardinalis cardinalis*) (east of the Missouri River) and American goldfinch (*Carduelis tristis*). The chalk cliffs on the lower reach of the Missouri River provide nesting sites for the cliff swallow.

A small number of eastern deciduous forest species whose breeding range does not reach South Dakota may also appear as migrants or casual visitors in the east. These include Baird's sparrow which is listed as rare in the state and prefers extensive idle or lightly-grazed mixed grass prairie, wet meadow or tall grass prairie, with abundant nesting cover. It has been reported from Stanley County (Ashton & Dowd1991).

Shorebirds

Shorebirds common to South Dakota include the American avocet *(Recurvirostra americana),* killdeer *(Charadrius vociferus),* marbled godwit *(Limosa fedosa*), longbilled curlew (*Numenius americanus*), willit (*Catoptrophorus semipalmatus*), spotted sandpiper (*Actitis macularia*), upland sandpiper (*Bartramia longicauda*) and Wilson's phalarope (*Phalaropus tricolor*).

The most notable shorebird in South Dakota is the whooping crane (*Grus americana*). The whooping crane is both Federally and state endangered. In South Dakota, the whooping crane is a predictable spring and fall migrant in the Missouri River drainage and in western South Dakota, with only occasional sightings in the eastern part of the state. Whooping cranes are discussed in Section 4.1.8.4 and in the Biological Assessment, Appendix K.

The interior least tern (*Sterna antillarum*) is Federally and state endangered. Piping plovers (*Charadrius melodus*) are Federally and state threatened. The birds are found in the same type of habitat as interior least terns. Interior least terns and piping plovers are discussed in more detail in Section 4.1.8.4 and in the Biological Assessment, Appendix K.

Large bodies of water have been formed by four dams on the Missouri River and have inundated trees, which provide nesting sites for the double-crested cormorant (*Phalacrocorax auritus*) and great blue heron (*Ardea herodias*).

Small Mammals

Small mammals that may occur in the project area include the big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasioncyceteris noctivagens*), little brown myotis (*Myotis lucifuga*), masked shrew (*Sorex cinereus*), short-tailed shrew (*blarina brevicauda*), least shrew (*Cryptotis parva*), deer mouse (*Permomyscus maniculatus*), hispid pocket mouse (*perognathus hispidus*), plains pocket mouse (*Perognathus flavescens*), olive-backed pocket mouse (*Perognathus fasciatus*), thirteen-rail lined ground squirrel (*Spermophilus tridecemrail lineatus*), Franklins's ground squirrel (*Spermophilus franklinii*) and meadow vole (*Miscrotus pennsylvanicus*).

Raptors

The bald eagle (*Haliaeetus albicilla*) is almost always found near water, primarily along river systems, large lakes, reservoirs and coastal areas. The reservoir system on the Missouri River provides large water areas that support large populations of wintering bald eagles. Bald eagles may be found overwintering in the lakes region of northeastern South Dakota and along the Missouri River, in the Pierre-Fort Pierre/Oahe Dam Area, the Karl Mundt National Wildlife Refuge/Fort Randall Dam Area and portions of the Missouri National Recreational River. The bald eagle is currently listed as Federally threatened and state endangered and is discussed in more detail in Section 4.1.8.4 and the Biological Assessment, Appendix K.

The osprey (*Pandion haliaetus*) is a state threatened bird which inhabitats lakes, large rivers and coastal bays. It feeds on fish and nests at the tops of large living or dead trees, on cliffs, on utility poles or on other tall manmade structures. In South Dakota, it is a historical nester in the southeastern part of the state and an uncommon migrant (Ashton & Dowd 1994).

Where trees occur, either naturally in stream bottoms or in planted shelterbelts, the Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*) and great horned owl (*bubo virginianus*) may be found. The ferruginous hawk (*Buteo regalis*), a ground nesting hawk that prefers dry, open grassland, is widespread west of the Missouri River. A raptor survey on the existing DM&E rail line was completed in April 1999. The results of this survey are provided in Table 4.1-11.

<u>State Listed Wildlife</u>

Table 4.1-12 lists reptiles, mammals, and birds considered by the state to be rare, threatened, or endangered species in the proposed project areas in South Dakota.

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line-South Dakota

Species [2]	1999 Status	County	Legal Location TWP RNG Sec 1/4 1/4 1/4	Coordinate Location Latitude	Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
RT	active	Brookings	109N 48W 12 SE SW SW	44° 15.31'	96° 32.59'	tree	agriculture-woodlot	White SE
BU	inactive	Brookings	110N 49W 35 NW SE SE	44° 17.03'	96° 40.21'	tree	agriculture-woodrow	Aurora
BU	inactive	Brookings	110N 49W 32 SW SW NW	44° 17.42'	96° 44.80'	tree	riparian-woodrow	Aurora
BU	inactive	Brookings	110N 52W 11 NW SW SW	44° 20.59'	97° 02.73'	tree	agriculture-woodlot	Lake Sinai
SW	occupied	Kingsbury	111N 53W 27 NW SW SW	44° 23.20'	97° 11.25'	tree	agriculture-woodlot	Badger
RT	active	Kingsbury	111N 55W 32 SW SW Sw	44° 22.23'	97° 28.26'	tree	agriculture-woodlot	Lake Preston West
RT	active	Kingsbury	111N 55W 32 SE NW NE	44° 22.80'	97° 27.48'	tree	willow-wetland	Erwin
RT	active	Kingsbury	111N 56W 29 NE SW SE	44° 23.15'	97° 35.27'	tree	cottonwood-wetland	De Smet
RT	active	Kingsbury	111N 57W 25 NE SW SE	44° 23.11'	97° 37.05'	tree	agriculture-woodrow	De Smet
SW	occupied	Kingsbury	111N 57W 33 SE SW SE	44° 22.13'	97° 40.71'	tree	agriculture	Manchester
BU	inactive	Beadle	110N 61W 05 SE NE SW	44° 21.60'	98° 11.21'	tree	agriculture-woodrow	Huron
RT	active	Beadle	111N 62W 32 NE SE NW	44° 22.84'	98° 18.41'	tree	wetland	Broadland
SW	occupied	Beadle	111N 64W 07 SW NE SE	44° 25.93'	98° 33.78'	tree	agriculture-woodlot	Wessington NE
RT	active	Beadle	111N 65W 14 SE NE NW	44° 25.57'	98° 36.58'	tree	cottonwood-wetland	Wessington NE
SW	occupied	Hand	112N 67W 14 NW SW NW	44° 30.69'	98° 51.75'	tree	willow-riparian	Miller SE
RT	active	Hand	112N 67W 10 SE NW SE	44° 31.23'	98° 52.13'	tree	cottonwood-riparian	Miller SE

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line-South Dakota

Species [2]	1999 Status	County	Legal Location TWP RNG Sec 1/4 1/4 1/4	Coordinate Location Latitude	Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
BU	inactive	Hand	112N 67W 10 SW NE SE	44° 31.28'	98° 51.95	tree	cottonwood-riparian	Miller SE
BU	unknown	Hand	112N 68W 13 SE NE NW	44° 30.74'	98° 57.23'	tree	riparian woodland	Miller
BU	active	Hand	112N 68W 13 NW NE NW	44° 30.87'	98° 57.43'	tree	agriculture-woodrow	Miller
BU	inactive	Hand	112N 68W 15 NW NW SE	44° 30.46'	98° 59.59'	tree	cottonwood-riparian	Miller
BU	inactive	Hyde	112N 71W 09 NW SW SW	44° 31.01'	99° 22.86'	tree	agriculture-woodrow	Highmore
RT	active	Hughes	112N 75W 08 SE NW SW	44° 31.08'	99° 52.90'	tree	cottonwood-riparian	Blunt
RT	active	Hughes	112N 76W 02 NW SE SW	44° 31.81'	99° 56.15'	tree	cottonwood-riparian	Blunt
BU	inactive	Hughes	112N 76W 02 NE SE SW	44° 31.74'	99° 56.17'	tree	cottonwood-riparian	Blunt
BU	inactive	Hughes	112N 76W 02 SE SE SW	44° 31.65'	99° 56.21'	tree	cottonwood-riparian	Blunt
BU	inactive	Hughes	112N 76W 02 NW SW SW	44° 31.75'	99° 56.70'	tree	cottonwood-riparian	Blunt

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line - South Dakota

Species[1]	1999 Status	County	Legal Location Twp Rng Sec ¼ ¼ ¼	Coordinate Location Latitude Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
RT	active	Hughes	112N 76W 20 NE SW NE	44° 29.62' 99° 59.69'	tree	deciduous riparian	Blunt
GHO	active	Hughes	111N 76W 05 SW NE SE	44° 26.70' 100° 59.42'	tree	grassland	Blunt
BU	inactive	Hughes	111N 76W 18 NE NE NE	44° 25.44' 100° 00.55'	tree	deciduous riparian	Canning
RT	active	Hughes	111N 77W 26 SW NW NE	44° 23.60' 100° 03.30'	tree	grassland	Canning
BU	inactive	Stanley	3N 29E 01 NE NE NW	44° 15.30' 100° 34.70'	tree	cottonwood-riparian	Teton
BU	inactive	Stanley	4N 30E 32 NW NW SW	44° 15.74' 100° 32.47'	tree	cottonwood-riparian	Teton
BU	inactive	Jones	2N 28E 05 NW SW SE	44° 09.41' 100° 46.44'	tree	cottonwood-riparian	Van Metre
RT	active	Jones	2N 28E 07 SW NW NW	44° 09.04' 100° 48.34'	tree	cottonwood-riparian	Van Metre
BU	inactive	Haakon	1N 24E 12 NE NE SW	44° 03.59' 101° 10.63'	tree	cottonwood-riparian	Midland
RT	active	Haakon	1N 24E 09 SE NW SW	44° 03.28' 101° 14.60'	tree	cottonwood-riparian	Midland
BU	inactive	Haakon	1N 22E 19 SE SE NW	44° 01.93' 101° 31.13'	tree	cottonwood-riparian	Phillip SE
RT	active	Haakon	1N 21E 14 NE SW SE	44° 02.46' 101° 33.26'	tree	cottonwood-riparian	Phillip SE
RT	active	Pennington	1S 17E 10 SE SW NW	43° 58.46' 102° 04.47'	tree	cottonwood-riparian	Wall NE
RT	active	Pennington	1N 15E 20 NE SE SW	44° 01.51' 102° 20.28 ‘	tree	cottonwood-riparian	Wasta SE
RT	active	Pennington	1N 14E 20 NE SW SW	44° 01.62' 102° 27.77'	tree	cottonwood-riparian	Wasta
RT	active	Pennington	1N 14E 10 SW NE SW	44° 02.57' 102° 26.54'	tree	cottonwood-riparian	Wasta
RT	active	Pennington	1S 13E 33 SE NW NW	43° 55.61' 102° 34.51'	tree	cottonwood-riparian	Brennan Flat
RT	active	Custer	3S 11E 01 NE SE SE	43° 48.75' 102° 44.44'	tree	cottonwood-riparian	Scenic SW
BU	inactive	Custer	6S 9E 16 SE NE SW	43° 31.48' 103° 03.33'	tree	cottonwood-riparian	Fairburn SE
BU	inactive	Custer	5S 10E 06 SW SE NE	43° 38.71' 102° 58.03'	tree	cottonwood-riparian	Red Shirt
BU	inactive	Custer	4S 10E 20 NW NE SE	43° 41.17' 102° 56.53'	tree	cottonwood-riparian	Red Shirt
RT	active	Custer	4S 10E 27 NW SW NW	43° 40.51' 102° 55.17'	tree	cottonwood-riparian	Red Shirt
BU	inactive	Custer	3S 11E 16 MW ME SW	43° 47.27' 102° 48.76'	tree	cottonwood-riparian	Folsom

Table 4.1-11
Raptor Nests within 0.5-mile of the DM&E Rail Line - South Dakota

Species[1]	1999 Status	County	Legal Location Twp Rng Sec ¼ ¼ ¼	Coordinate Location Latitude Longitude	Nest Substrate	Surrounding Habitat	Topographic Quad
BU	inactive	Custer	3S 10E 28 SE SW NW	43° 45.61' 102° 48.80'	tree	cottonwood-riparian	Folsom
GE	active	Custer	3S 9E 36 NW NW NW	43° 45.16' 102° 59.84'	powerpole	grasslands	Caputa SW
GHO	active	Custer	3S 9E 26 SW SE SW	43° 45.26' 103° 00.84'	tree	cottonwood-riparian	Hermosa SE
RT	active	Custer	4S 8E 02 SE NW NW	43° 38.90' 103° 08.41'	tree	cottonwood-riparian	Fairburn
GE	active	Custer	5S 9E 07 SW SW NE	43° 37.74' 103° 05.61'	tree	cottonwood-riparian	Fairburn NE
RT	active	Custer	6S 9E 18 NW NW SW	43° 31.61' 103° 06.19'	tree	cottonwood-riparian	Fairburn SE
RT	active	Custer	5S 8E 14 NW NW SW	43° 31.60' 103° 08.57'	tree	cottonwood-riparian	Fairburn SW
RT	active	Fall River	7S 8E 07 NW SW SE	43° 26.38' 103° 13.40'	tree	cottonwood-riparian	Smithwick NW
RT	active	Fall River	7S 7E 34 SW SE SW	43° 23.43' 103° 16.53'	tree	deciduous woodland	Buffalo Gap
BU	inactive	Fall River	8S 7E 24 SE NW SW	43° 20.25' 103° 14.47'	tree	cottonwood-riparian	Smithwick
GHO	active	Fall River	8S 8E 15 NW SE SW	43° 20.95' 103° 09.44'	tree	grassland-riparian	Smithwick
RT	active	Fall River	9S 8E 19 NE NW NE	43° 15.57' 103° 12.78'	tree	grassland-riparian	Smithwick
GHO	active	Fall River	10S 5E 01 NW NW NE	43° 13.00' 103° 28.34'	tree	grassland-riparian	Lone Well Creek West
RT	active	Fall River	9S 6E 31 NE NE SE	43° 13.40' 103° 29.34'	tree	ponderosa-grassland	Lone Well Creek West
RT	active	Fall River	9S 4E 29 NE SE NW	43° 14.45' 103° 40.32'	tree	cottonwood-riparian	Rumford
RT	active	Fall River	9S 4E 31 NW SE SW	43° 13.19' 103° 41.69'	tree	ponderosa pine	Rumford
RT	active	Fall River	8S 2E 26 SW SW NE	43° 19.61' 103° 50.69'	tree	ponderosa pine	Edgemont
BU	inactive	Fall River	8S 2E 27 NE NE NW	43° 19.97' 103° 51.99'	tree	cottonwood-riparian	Edgemont
RT	active	Fall River	8S 2E 07 NW NW NE	43° 22.54' 103° 54.49'	tree	cottonwood-riparian	Burdock

Notes: [1] - Survey conducted April 22-28, 1998.
[2] - Raptor Species Abbreviations are: RT=red-tailed hawk, SW=Swainson's hawk, BU=unknown buteo (PIC Technologies 2000)

**Table 4.1-12
State Rare, Threatened, or Endangered Species
in the Proposed and Existing DM&E Corridors across South Dakota**

Common Name	State Rank	Dates Observed	County Name
spiny softshell	S2	1994	Pennington
spiny softshell	S2	1987	Pennington
smooth softshell	S2	1993	Hughes
Western box turtle	S2	1986	Hughes
Western box turtle	S2	1992	Hughes
false map turtle	S3	1997	Hughes
Northern river otter	S2	1979	Hughes
plains spotted skunk	S3	1997	Hughes
plains spotted skunk	S3	1996	Hughes
plains spotted skunk	S3	1993	Hughes
plains spotted skunk	S3	No date given	Pennington
silver-haired bat	S4	1994	Stanley
least shrew	S2	1993	Hughes
least shrew	S2	1992	Hughes
least shrew	S2	1954	Jackson
pygmy shrew	S2	1992	Hughes
pygmy shrew	S2	1972	Brookings
dwarf shrew	S1	1993	Hughes
dwarf shrew	S1	1970	Jackson
Le Conte's sparrow	S1S2B, SZN	1968	Beadle
Henslow's sparrow	SUB, SZN	1969	Hand
Henslow's sparrow	SUB, SZN	1965	Brookings

Table 4.1-12
State Rare, Threatened, or Endangered Species in the Proposed and Existing DM&E Corridors across South Dakota

Common Name	State Rank	Dates Observed	County Name
black-and-white warbler	S2S3B, SZN	1979	Hughes
Sprague's pipit	S2B, SZN	1973	Stanley
Northern mockingbird	S3B, SZN	1992	Hughes
long-eared owl	S3B, S3N	1996	Stanley
long-eared owl	S3B, S3N	1970	Brookings
barn owl	S2B, SZN	1979	Brookings
barn owl	S2B, SZN	1987	Stanley
barn owl	S2B, SZN	1982	Hughes
ferruginous hawk	S4B, SZN	1984	Hyde
ferruginous hawk	S4B, SZN	1983	Hyde
Swainson's hawk	S4B, SZN	1994	Stanley
broad-winged hawk	S2B, SZN	1966	Hughes
Cooper's hawk	S3B, SZN	1983	Hughes
green-backed heron	S2S3B, SZN	1975	Beadle
great egret	S3B, SZN	1979	Brookings
great blue heron	S4B, SZN	1991	Hughes
great blue heron	S4B, SZN	1991	Pennington

Table 4.1-12
State Rare, Threatened, or Endangered Species
in the Proposed and Existing DM&E Corridors across South Dakota

Common Name	State Rank	Dates Observed	County Name

Ranks:
- S1= critically imperiled because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- S2= Imperiled because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- S3= Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 of 100 occurrences.
- S4= Apparently secure, though it may be quite rare in parts of its range, especially at the periphery. Cause for long term concern.
- SU= Possibly in peril, but status uncertain, more information needed.
- SH= Historically known, may be rediscovered.
- SZ= No definable occurrences for conservation purposes, usually assigned to migrants.

SDNHDB, 1998

4.1.8.3 Aquatics and Fisheries

The existing DM&E rail line in South Dakota crosses and is in close proximity to several rivers, streams and lakes that provide habitat for a diversity of fish species. Major rivers crossed by the rail line include the Big Sioux River west of Brookings, James River east side of Huron, the Missouri River near Pierre, and the Cheyenne River near Wasta and near Oral. In addition, the rail line is also in close proximity to several lakes that contain fish populations.

Some of the common fish species inhabiting the Big Sioux, James, Cheyenne, and Missouri Rivers are provided in Table 4.1-13.

Table 4.1-13
Common Fish-South Dakota

River	Fish Species
Big Sioux	northern pike (*Esox lucius*) walleye (*Stizostedion vitreum*) yellow perch (*Perca flavescens*) white crappie (*pomoxis annularius*) channel catfish (*Ictlurus punctatus*) black bullhead (*Ameiurus melas*) flathead catfish (*Pylodictis olivaris*) smallmouth buffalo (*Ictiobus bubalus*) shorthead redhorse (*Moxostoma macrolepidotum*) common shiner (*Luxilus cornutus*) red shiner (*Cyprinella lutrensis*) sand shiner (*Notropis stramineus*) flathead minnow (*Pimephales promelas*)
James	northern pike walleye yellow perch channel catfish bigmouth buffalo (*Ictiobus cyprinellus*) common carp (*Cyprinus carpio*) golden shiner (*Notemigonus crysoleucas*) creek chub (*Semotilus atromaculatus*) white sucker (*Catostomus commersoni*) golden redhorse (*Moxostoma macrolepidotum*)

Table 4.1-13
Common Fish-South Dakota

River	Fish Species
Missouri	walleye sauger (*Stizostedion canadense*) northern pike channel catfish flathead catfish crappie yellow perch rainbow trout (*Salmo gairdneri*) brown trout (*salmo truuta*) shovelnose sturgeon (*Scaphirhynchus platorynchus*) paddlefish (*Polyodon spathula*) goldeneye (*Hiodon alosoides*) bigmouth buffalo spotfin shiner (*Cyprinella spiloptera*) bigmouth shiner (*Notropis dorsalis*) shortnose gar (*Lepisosteus platostomus*)

Table 4.1-13
Common Fish-South Dakota

River	Fish Species
Cheyenne	white bass (*Morone chrysops*) largemouth bass (*Micropterus salmoides*) smallmouth bass (*Micropterus dolomieui*) northern pike (*Esox lucius)* bluegill (*Lepimis macrochirus*) green sunfish (*Lepimis cyanellus*) orangespotted sunfish (*Lepimis humilis*) sauger (*Stizostedion canadense*) freshwater drum (*Aplodintus grunniens*) yellow bullhead (*Ameiurus natalis*) black bullhead (*Ictalurus melas*) channel catfish (*Ictalurus punctatus*) common carp (*Cyprinus carpio*) creek chub (*Semotilus atromaculatus*) spottail shiner (*Notropis hudsonius*) plains topminnow (*Fundulus sciadicus*) flathead chub (*Platygobio gracilis*) plains minnow (*Hybognathus placitus*) sand shiner (*Notropis stramineus*) shorthead redhorse (*Moxostroma macrolepidotum)* river carpsucker (*Carpiodes carpio*) stonecat (*Noturus flavus*) sturgeon chub (*Machrhybopisis gelida*) white sucker (*Catostomus commersoni*) longnose dace (*Rhinichthys cataractae*) fathead minnow (*Pimephales promelas*) plains killifish (*Fundulus zebribus*) western silvery minnow (*Hybognathus argyitis)* emerald shiner (*Notropis atherinoides*) goldeye (*Hiodon alosoides*) red shiner (*Cyprinella lutrensis*)

South Dakota State University (Big Sioux, James, and Missouri)
Bureau of Reclamation, Draft Environmental Statement Angostura Unit (Cheyenne River)

Lakes in the project area support a number of game fish species including crappie, bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus dolomieui*), yellow perch, northern pike, walleye and black bullhead.

The waterways in the project area have been impacted by agricultural and land use practices. Agricultural runoff contributes to pollution from fertilizer, pesticide and sediment. This pollution has contributed to degradation of project area rivers and lakes. Rivers in the project area have been especially impacted by sediment pollution, as the sand and gravel substrate has changed to a silty substrate in certain locations. However, recent surveys of the Big Sioux River have shown that certain "clean water" species, such as the spottail shiner, have reappeared in the river. In addition, game fish such as walleye and northern pike have increased in population. This may be the result of less silt and improved spawning substrate for certain species (National Biological Service 1993). A change in agricultural practices, with more emphasis on soil conservation, has helped improve the water quality of the Big Sioux.

Dams also appear to restrict the distribution of certain fish species in project area rivers. Surveys conducted of the Big Sioux and James rivers have shown that walleye and channel catfish congregate below the dams; which are probably responsible for blocking their spawning migrations (National Biological Service 1993). Dams have helped contribute to the lack of spawning success, and the decrail line in the young of walleye and other species.

Fisheries management practices within the project area focus on habitat rehabilitation, stream bank and riparian zone protection and fish stocking. The emphasis on these management practices has helped the fisheries in many project area rivers and lakes.

Mussel populations in project area rivers have decrail lined due to agricultural practices that have changed the substrate and water quality. The two most common species found in the riverine systems in South Dakota are the giant floater (*Anodonta grandis*) and the white heel-splitter (*Lasmigona complanata complanata*). The species *Lampsilis* was once abundant in project area rivers, although it has now been eliminated by pollution in many of the watersheds.

Mussels that have managed to thrive in project area rivers have adapted to a variety of substrates, thus allowing their populations to remain stable (National Biological Service). Sediment pollution is the main problem with sustaining mussel populations in project area rivers. Efforts directed at riparian zone management may help mussels in this region recover in the future.

4.1.8.4 Endangered, Threatened and Special Status Species

The U.S. Fish and Wildlife Service (USFWS) was consulted regarding endangered and threatened species in the proposed project area. The USFWS identified nine Federally-listed endangered or threatened wildlife and plant species that could potentially occur in the project area. These are the black-footed ferret (*Mustela nigripes*, endangered), piping plover (*Charadrius melodus circumcintus*, endangered), whooping crane (*Grus americana*, endangered), interior least tern (*Sterna antillarum*, endangered), Topeka shiner (*Notropis topeka*, endangered), pallid sturgeon (*Scaphir hynchus albus*, endangered), American burying beetle (*Nicrophorus americanus*, endangered), Ute ladies' tresses (*Spriranthes diluvialis*, threatened) and bald eagle (*Haliaeetus leucocephalus*, threatened).

Two other species, swift fox (*Vulpes velox*) and sturgeon chub (*Macrhybopsis gelida*) are candidates for listing as endangered or threatened. In addition to these species the USFWS has been petitioned to list the black-tailed prairie dog (*Cynomys ludovicianus*) under the Endangered Species Act and its status is currently being reviewed.

The South Dakota Natural Heritage Program was contacted to obtain more specific information regarding these species. General descriptions of where the species may occur within the proposed project area are presented below. More detailed descriptions of the species, species habitat and occurrences are presented in the Biological Assessment (Appendix K).

4.1.8.4.1 Black-footed Ferret

Black-footed ferrets are members of the weasel family. They live in arid prairies in prairie dog colonies. Black-footed ferrets feed primarily on prairie dogs (90 percent) and utilize their burrows for dens. Black-footed ferrets are nocturnal and spend much of their time underground so their presence in an area is difficult to confirm (Whitaker 1980). According to available information compiled by Clark (1978), the USFWS (Jobman and Anderson 1991), and South Dakota Natural Heritage Database (SDNHDB 1998) the following sightings or physical evidence (1988 or earlier) exist for black-footed ferrets within counties in South Dakota through which the proposed project would pass: three in Custer, two in Fall River, five in Pennington and three in Shannon counties. Black-footed ferrets have been reintroduced into several locations. In 1996 reintroduction began in Conata Basin/Badlands which are within portions of the BGNF and Badlands National Park (USFWS 1998a).

4.1.8.4.2 Piping Plover

Piping plover are one of six belted plovers found in North America. Piping plovers occur in the project area during its breeding and nesting season. They were recorded in the 1980's near Pierre, South Dakota in Hughes County on islands or sandbars in the Missouri River in the proposed project area (South Dakota Natural History Data Base 1998). Surveys for piping plovers along the Cheyenne River and Lake Oahe noted their presence; however, no nesting birds were found on the Cheyenne River during 1986 and 1987 (Dirks et al. 1993a). Surveys were conducted for piping plovers along 20 miles of the Cheyenne River in Custer and Pennington counties in 1994 but no evidence of the species was found (Hetlet 1994). Likewise, no piping plovers were observed during a survey conducted along approximately 28 miles of the Cheyenne River between Spring Creek and Wasta, South Dakota on June 26, 1999.

4.1.8.4.3 Whooping Crane

Whooping cranes are found only in North America. Whooping cranes currently exist in three wild populations and four captive locations, totaling 260 individuals. Most whooping cranes migrate from Wood Buffalo National Park in Canada to Aransas National Wildlife Refuge on the Texas gulf coast. The migration pathway passes through western South Dakota, mainly in the Missouri River basin. From 1957 through 1990, 5 confirmed sightings of whooping cranes were made from Beadle County, 14 sightings from Hughes County, 20 sightings from Stanley County, 2 sightings from Haaken County, 7 sightings from Jackson County and 5 sightings from Pennington County.

During the spring migration in 1988, a small group (4 adults and 1 young) of whooping cranes was observed feeding in a grain field north of Rapid Creek approximately 3 miles from the existing rail line in Pennington Country. A small group (5) of whopping cranes were observed a week later approximately 11 miles southeast of Wall in eastern Pennington Country (South Dakota Natural History Data Base 1999). The following year, 1989, one whooping crane was seen flying 3 miles east of Ellsworth Airforce Base in Pennington County during fall migration (USFWS 1989).

4.1.8.4.4 Interior Least Tern

Interior least tern occur in South Dakota. Successful nesting has been documented on the Missouri and Cheyenne rivers (Dirks et al. 1993b). A survey was conducted along approximately 28 miles of the Cheyenne River between Spring Creek and Wasta, South Dakota on June 26, 1999 with no sightings of interior least terns. Two records of interior least terns on the Missouri River in the vicinity of Pierre, Hughes County (recorded in 1975) and Fort Pierre, Stanley County (recorded in 1984) in the proposed project area were provided by the South Dakato Natural History Data Base (1998).

4.1.8.4.5 Topeka Shiner

The Topeka shiner was collected in the late 1960's from the Cheyenne River embayment at Lake Oahe. They have been found in South Dakota as recently as 1997 in two streams in Brookings County. Recent collections of Topeka shiners have been made in the Big Sioux River watershed in Brookings County and the James River watershed in Beadle and Kingsbury Counties in eastern South Dakota (USFWS 1998 unpub. data).

4.1.8.4.6 Pallid Sturgeon

Pallid sturgeon are a species that inhabit swift sections of big rivers. The sturgeon has been recorded from the Missouri River in Pierre, Hughes and Stanley counties between 1967 and 1989 within the proposed project area (South Dakata Natural History Data Base 1998). It is native to the Missouri and Mississippi rivers and currently is still present in the impounded portion of the Missouri River known also as Lake Sharpe (Dryer and Sandvol 1993).

4.1.8.4.7 American Burying Beetle

The American burying beetle is the largest North American member of the genus *Nicrophorus* within the family Silphidae. Members of this family include those beetles which utilize carrion as a food source (Anderson & Peck 1985). The beetle has been recorded in Brookings County; probably around 1945, within 1 mile of the existing railroad. Recent survey work across the state indicates that the American burying beetle is extirpated from most of its former range, and is now known only in southern Tripp, southwest Gregory, and eastern Todd counties (South Dakato Natural History Data Base 1998). Given the proximity of collections in Cherry County, Nebraska and that the beetle is a strong flier and can travel long distances in search of carrion, they may be present in suitable habitats with the project area (USFWS 1991). At this time, any habitat in South Dakota with significant humus and/or topsoil suitable for burying carrion is considered potential beetle habitat.

4.1.8.4.8 Ute Ladies' Tresses Orchid

Ute ladies' tresses orchid is a perennial, terrestrial orchid. It occurs in moist soils in wet meadows near springs, lakes or perennial streams. Increased disturbances to stream systems and conversion of land to urban uses has resulted in the decrail line of this orchid species. This species can only be positively identified when in flower. However, it may not flower every year

(Magrath 1973). Therefore, potential habitat is generally considered to contain them. A survey for the orchid was conducted in September 1998. Two sites, one each in Hay Canyon and Dry Creek (Fall River County) were considered potential habitat (Kass 1998). However, no orchids were found during the survey. The results of this survey are included in the Biological Assessment (Appendix K)

4.1.8.4.9 Bald Eagle

Bald eagles have been documented wintering throughout the project area. Observations seem to indicate that the Cheyenne River corridor in South Dakota is important to wintering bald eagles. Communal nocturnal roosts, diurnal perch sites and feeding areas are all key winter habitat components that are near the proposed project. Specific locations of reports of eagles in the proposed project area may be found in the Biological Assessment, Appendix K.

4.1.8.4.10 Swift Fox

The swift fox is a member of the Canidae family and is the smallest of the American foxes. The swift fox occupies short-, mid-, and mixed-grass prairies (Carbyn 1993). The swift fox is unafraid of man, therefore, it has been susceptible to trapping and poisoning efforts aimed at coyotes and wolves. Other factors affecting the decrail line of the swift fox include fragmentation and destruction of suitable habitat, interspecies (coyotes, other fox species) competition, prey reduction due to rodent control measures, hunting and predation (particularly from coyotes). There are records of swift fox in Custer and Fall River counties, South Dakota from 1970 through 1990 (South Dakota Natural History Data Base 1998). Observations in southwestern South Dakota indicate that the species occurs in the proposed project area.

4.1.8.4.11 Sturgeon Chub

Sturgeon chub are members of the minnow family. They inhabit shallow sand or gravel bottom zones in areas with strong currents in warm and highly turbid medium to large rivers (Lee et al. 1980). Alteration of larger rivers through impoundment, channelization and snag removal, reducing the amount of riffle habitat, appear to be some of the causes for the decrail line of the sturgeon chub. The fish occurs throughout the Missouri River drainage and the lower Mississippi River (USFWS 1993c). Sturgeon chub have been repeatedly documented in the Cheyenne River in Pennington County, South Dakota (USFWS 1993a, USFWS 1993b) and in Custer County as recently as 1995 (SDNHDB 1998). More recently in 1996, sturgeon chubs were collected at several sampling sites in the Cheyenne River between Angostura Dam and Lake Oahe by researchers from South Dakota State University (USFS unpub. data).

4.1.8.4.12 Black-tailed Prairie Dog

Black-tailed prairie dogs are social animals that live in large colonies or towns in short- and mid-grass prairie. Since the turn of the century the black-tailed prairie dog population has decrail lined by 98 percent. Less than 1 percent of the original prairie dog habitat remains intact. This decrail line is a result of habitat fragmentation through agriculture and urban development, eradication by ranchers, state and Federally supported animal control programs, recreational shooting, and wildlife disease. Prairie dogs play an important role in their ecosystem. Badgers, coyotes, weasels, golden eagles, hawks, black-footed ferrets, and other predators feed upon the prairie dog. Additionally, several species such as rabbits, a variety of snakes, burrowing owls and black-footed ferrets use prairie dog burrows for habitat. Additionally, mountain plovers, grasshopper sparrows and other ground nesting birds can be found in greater numbers in prairie dog towns. (Nebraska Game and Parks Commision no date-b). The prairie dog's continued survival is imperative to the survival of Federally endangered black-footed ferrets.

Black-tailed prairie dog colonies occur throughout the project area. The current activity status of each prairie dog colony is unknown. Some colonies have been poisoned by county weed and pest control agents and/or private land owners. For most of the colonies that have been mapped there is no additional information about the extent or geographic proximity of other colonies that would form a local colony complex.

4.1.9 TRANSPORTATION

There are two interstate highways in the project area of South Dakota. Interstate 29 (I-29) is a north/south route that crosses over the existing DM&E rail line just east of Brookings. Interstate 90 (I-90) is an east/west route that parallels, south of the project area, the existing DM&E rail line. However in the western portion of the project area, the rail line trends to the south and I-90 trends to the north. These two systems converge near Wall, South Dakota, and parallel each other into Wasta, South Dakota. At Wasta, the DM&E rail line extends southwest and I-90 continues west.

There are numerous state and U.S. highways in the project area. U.S. Highway 14 is an east/west route that generally parallels the existing DM&E rail line from Brookings, South Dakota, to Wall, South Dakota. The existing DM&E rail line crosses U.S. Highway 14 six times in Brookings County, with an average daily traffic (ADT) of 2,962; once in Kingbury County with an ADT of 1,285; two times in Beadle County with ADTs of 2,137 and 2,671; once in Stanley County with an ADT of 3,500; and once in Jackson County with an ADT of 1,020. The remaining major U.S. and state highway routes in the project area are all north/south routes. The U.S. highways in the project area include U.S.Highway 81 (which passes through Arlington), and

U.S. Highway 281 (which passes through Wolsey). U.S. Highway 83 joins U.S. Highway 14 for a short time. The state routes (SR) in the project area include SR-25 (which passes through De Smet), SR-37 through Huron, SR-45 through Miller, SR-47 through Highmore, SR-63 through Midland and SR-73 (which passes through Philip).

Just east of Wall, U.S. Highway 14 joins I-90 westward to Rapid City and on into Wyoming. U.S. Highway 385 is a north/south route that passes west of Rapid City and passes through Custer and Hot Springs. Mount Rushmore Road, also known as U.S. Highway 16, is also a north/south route that heads southward from Rapid City to Custer, South Dakota and then on to Newcastle, Wyoming.

There is an extensive network of county roads in the project area. In eastern South Dakota these roads generally follow section lines forming a grid-like pattern. However, southwest South Dakota does not fit this description. Because of the mountainous topography and numerous rural areas with no roads, the county roads are sporadic and do not form a uniform grid pattern. While some are paved, most are gravel. Around towns and communities, ADTs may be significantly higher than in rural areas. However, ADT's are still generally low due mainly to use by local residents.

The USFS maintains a network of roads within lands under its management. These roads are generally dirt or gravel roads and can be used by the general public. They provide access to public lands as well as for ranchers who lease the lands for grazing and hay production. They have low levels of traffic and these traffic levels vary seasonally. Traffic levels likely decrease in the winter months and become more prevalent in the summer months and in Autumn during big game seasons. Because these are USFS roads, access is controlled by the USFS. While these roads are generally open to the public, they can be closed by the USFS when appropriate, such as during roadwork.

There are many private roads in the project area. They are distributed throughout the project area. These roads consist of driveways and farm roads. Farm roads would primarily be used for slow moving farm equipment, while both types of private roads would be used for a low number of personal vehicles.

The DM&E operates an existing rail line from just north of Winona, Minnesota westward, entering the State of South Dakota just southeast of Brookings. The rail line continues westward across South Dakota, through the communities of Brookings, Huron, Pierre and Philip before splitting to the north and to the south in Rapid City. The north spur travels through Sturgis and Belle Fourche, South Dakota and terminates at Bentonite Spur, Wyoming. The south spur travels through Buffalo Gap and Oelrichs, South Dakota continuing on to Chadron, Nebraska. Other rail lines in the project area include a Burlington Northern/Santa Fe Railway Company (BNSF) rail line that begins at Yale, South Dakota, just northwest of Huron and continues northward through Vienna, South Dakota. Another BNSF rail line passes north and south through Wolsey, South Dakota. This rail line passes through Tulare to the north and Mitchell to the south.

BNSF also has a rail line extending north that passes through Chadron, Nebraska, Edgemont, South Dakota and continues on to Newcastle and Moorcroft, Wyoming. This rail line splits at Donkey Creek, southeast of Gillette, one end connecting to the north/south rail line operated jointly by BNSF and UP and the other continuing into Gillette and north into Montana.

There are several airports and landing strips in the project area. The airport in Brookings County is the Brookings Municipal Airport. Lake Preston Municipal Airport and the De Smet Airport are in Kingsbury County. The Huron Regional Airport is in Huron. The Miller Municipal Airport is in Hand County and the Highmore Municipal Airport is in Hyde County. The Harrold Municipal Airport and the Pierre Municipal Airport are in Hughes County. The Hayes Airport is in Stanley County and the Philip Municipal Airport is in Haakon County. The Hot Springs Municipal Airport is approximately 5 miles southeast of Hot Springs and is located about 6 miles west of DM&E's existing rail line between Oral and Smithwick. The Edgemont Municipal airport is just southwest of Edgemont. The Rapid City Regional Airport is located approximately three miles east of Rapid City and is within 2 miles of the existing DM&E rail line. Numerous private landing strips are scattered throughout the area.

The Railroad Buttes Management Area, a popular site for off highway vehicles (OHV), is located approximately 3 miles south of Farmingdale, South Dakota. This area is within five miles of the existing DM&E rail line east of Rapid City and includes 50 square miles of land in the Fall River Ranger District of the Buffalo Gap National Grassland. Other trails in the area include the over 600 miles of National Forest, Wind Cave National Park, Jewel Caves trails within USFS, and the Angostura Recreation Area. There are also several bicycle trails in the project area. Additional discussion of trails in the project area is provided in Section 4.1.15, Recreation.

4.1.10 SAFETY

There are approximately 479 grade crossings along the existing DM&E rail line in South Dakota, 262 of which are public crossings. Of these, 5 are protected with flashing lights and gates, 31 are protected with flashing lights and 226 are protected by crossbucks and stop signs. Most crossings are protected by stop signs or crossbucks only. Many of the private or farm crossings do not have any form of crossing protection. There were 23 observed accidents at the DM&E rail line grade crossings in South Dakota between 1993 and 1997.

The existing DM&E rail line in South Dakota passes through 20 school districts. Buses from the surrounding schools operate over the DM&E rail line and road systems in the area. From east to west, the potentially affected school districts are Elkton, Brookings, Sioux Valley, Arlington, Lake Preston, De Smet, Iroquois, Huron, Wolsey, Wessington, Miller, Hyde County (Highmore), Harrold Schools (no crossings), Sully Buttes (Onida), Pierre, Pierre Head Start Program, Stanley (Fort Pierre), Midland and Haakon (Philip). Some school districts have buses that do not cross the existing DM&E rail line, some cross as few as 2 times per day; while other school districts have buses that cross the tracks as many as 109 times per day. Table 4.1-14 shows the number of bus crossings for each school district. Due to the irregularity of school activity bus schedules (such as field trips and sporting events), these crossing are not included in the total crossings per day.

Table 4.1-14
South Dakota School District Bus Crossings of the Existing DM&E Rail Line

School District	Street Name	Number of Crossings/Day*
Elkton Public Schools 5-3	Cornell Ave. Highway 13 475th Ave (Aurora) 478th Ave (E. of Aurora) 485th Ave & 217th St. 483rd Ave & 216th St. 487th Ave & 217th St.	14 6 2 2 2 2 2
Brookings School District 5-1	Medary Avenue 17th Avenue 22nd Avenue Main Street Western Avenue Unnamed street in Aurora	38 29 22 8 6 6
Sioux Valley School District - Volga		
Arlington School District	Main Street Unnamed country road	8 4
Lake Preston Public School, 38-3	441st Avenue 449th Avenue	6 2
De Smet School District 38-2 - De Smet, SD	Highway 25 436th Avenue	10 2

Table 4.1-14
South Dakota School District Bus Crossings of the Existing DM&E Rail Line

School District	Street Name	Number of Crossings/Day*
Iroquois School District	County Line (Sioux Street) Quapaw Street	11 11
Huron School District 2-2 - Huron, SD	Dakota Avenue Lincoln Avenue Custer Avenue 398th Avenue 404th Avenue 409th Avenue† 410th Avenue†	22 8 2 2 4 †occasional, especially during adverse weather, twice daily
Wolsey Public Schools 2-5 - Wolsey, SD	State Highway 281/14 Unnamed road, 2.1 mi. east of 281/14 Unnamed road, 1.2 mi. west of 281/14	12 4 2
Harrold Schools	No crossings	0
Wessington Public School	Main Street	2
Miller School District - Miller, SD	Miller, SD: Main Street 359th Avenue St. Lawrence, SD: 367th Avenue Commercial Avenue 1 block east of Commercial Avenue Ree Heights, SD: Main Street 352nd Avenue	 10 2 4 2 2 6 2
Harrold School District	No crossings	-
Hyde County Schools - Highmore, SD	Main Street	8

Table 4.1-14
South Dakota School District Bus Crossings of the Existing DM&E Rail Line

School District	Street Name	Number of Crossings/Day*
Sully Buttes Schools - Onida, SD	Ash Avenue	2
Pierre - Pierre, SD	Buses operate on every road in town, but two of the main roads that cross the rail line are: Poplar Harrison	 4 - approx. 4 - approx. Note: Only two mini-buses only for transporting special education children assigned to other schools. Route varies every day depending on school schedules.
Pierre Head Start Program - Pierre, SD	Highland Lowell Ree Sioux Poplar	4 8 4 4 4
Stanley County Schools - Ft. Pierre, SD	N/A	**
Midland School District - Midland, SD	N/A	**
Haakon School District - Philip, SD	N/A	**

* According to information provided by district and/or bus company representatives.
** Activity buses only (i.e. for extracurricular events such as athletic and music events).

4.1.11 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

During 1997 and 1998 DM&E transported a variety of hazardous materials, many of which are associated with rural agricultural activities. Hazardous materials transported included liquefied petroleum gas (LPG), anhydrous ammonia, phosphoric acid, ferric chloride, fuel oil and ethylene acetyl (flammable gas). DM&E currently transports approximately 200-250 carloads of these materials, per year, throughout its system. The majority of the carloads contain LPG, phosporic acid and anhydrous ammonia. DM&E operates no key trains.[1]

Hazardous Waste Sites

Railroads transport and utilize a wide variety of hazardous materials. Additionally, they pass through developed, often highly industrialized areas where hazardous materials are stored and used. DM&E is no exception however, the amount of industrial activity along the existing rail line is limited. The presence of hazardous material presents opportunities for contamination, either from improper handling, spills, or accidents. While required precautions may currently be implemented, past incidents may have resulted in contamination. Contamination may be the result of railroad or other, non-railroad related activities adjacent to the rail line. Such contamination may not currently pose a problem or risk. However, construction activities in or through contaminated areas can expose contaminants to the environment and result in negative impacts. Therefore, appropriate precautions are required in such areas.

A records review of various Federal and state databases was conducted to identify areas of potential contamination within the project area. Sites within 1.0 mile of the existing rail line and potential new construction alternatives were considered to be in the project area. Databases reviewed included:

- Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)
- EPA National Priorities List (NPL)
- EPA Resource Conservation and Recovery Information System (RCRIS) Permitted Treatment, Storage and Disposal Facilities (TSD)
- EPA Resource Conservation and Recovery Information System (RCRIS) including RCRIS Large Quantity Generators (LQG)
- EPA Resource Conservation and Recovery Information System (RCRIS) including RCRIS Small Quantity Generators (SQG)
- EPA Emergency Response Notification System - 1999 (ERNS)
- EPA Corrective Action Reports (CORRACTS)
- South Dakota Leaking Underground Storage Tanks (LUST)
- South Dakota State Hazardous Waste Sites (SHWS)

[1] Any train with five or more tank carloads of chemicals classified as a Poison Inhalation Hazard (PIH), or with a total of 20 rail cars with any combination of PIHs, flammable gases, explosives, or environmentally sensitive chemicals.

- South Dakota Underground Storage Tanks (UST)
- South Dakota Solid Waste Facilities/Landfill (LF).

The results of the review are discussed below.

One NPL site, Ellsworth Air Force Base, was identified by the database as being within one-mile of the DM&E rail line. Most of the operable units and areas of concern at Ellsworth Air Force Base are more than two miles north of the existing DM&E rail line.

CERCLIS contains data on potentially hazardous waste sites that have been reported to the U.S. EPA by states, municipalities, private companies and private persons, pursuant to §103 of the Comprehensive Environmental Response, Compensation and liability Act (CERCLA). CERCLIS contains sites which are either proposed to be or are on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL.

As of July 1, 1999 40 CERCLIS sites are located in South Dakota. Two of these CERCLIS sites are located within 1-mile of the DMERR alignment. These 2 CERCLIS sites are the Ellsworth Air Force Base, which is also listed on the National Priorities List and the Dakota, Minnesota & Eastern Roundhouse in Huron, South Dakota.

CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. CERCLIS - NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund Action of NPL Consideration. In the latter case, other regulatory mechanisms such as Resource Conservation and Recovery Act (RCRA) Corrective Action or remediation under the auspices of a state-approved program may be used to address contamination at the property. One CERCLIS - NFRAP site, the Edgemont Uranium Mill Tailings, was identified by the database search. This site is immediately east of the town of Edgemont. This site is being addressed by the South Dakota Department of Environment and Natural Resources.

SHWS records are the state's equivalent to CERCLIS. These sites may or may not already be listed on the Federal CERCLIS list. Priority sites planned for cleanup using state funds are identified along with sites where the cleanup will be paid for by potentially responsible parties. The data comes from the South Dakota Department of Environment and Natural Resources. One SHWS was identified by the database search; the Edgemont Uranium Tailings site.

RCRIS Permitted Treatment Storage and Disposal Facilities ((TSD) database includes selected information on facilities that generate, store, treat, or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). The source of this database is the U.S. EPA. No RCRA TSD's are located within 1-mile of the DM&E rail line.

The Solid Waste Facilities/Landfill (SWF/LF) records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data comes from the South Dakota Department of Environment and Natural Resources' Licensed Solid Waste Facilities list. The database was searched to a 0.5-mile radius of the project area. No SWF/LF sites within 0.5-mile of the project area were identified in the database search.

LUST incident reports contain an inventory of reported LUST incidents. The data comes from the South Dakota Department of Environment and Natural Resource's Water Quality Program. The database was searched to a 0.5-mile radius of the proposed DM&E rail line. Table 4.1-15 provides a listing of LUST sites by county along the proposed DM&E rail line.

Table 4.1-15
LUST Sites-South Dakota

COUNTY	NUMBER OF LUST SITES WITHIN 0.5-MILE OF PROJECT AREA
Brookings	17
Kingsbury	4
Beadle	9
Hand	2
Hyde	3
Hughes	9
Stanley	0
Jones	0
Haakon	2
Jackson	0
Pennington	14

Table 4.1-15 LUST Sites-South Dakota	
COUNTY	NUMBER OF LUST SITES WITHIN 0.5-MILE OF PROJECT AREA
Custer	7
Fall River	7
Shannon	2

UST database contains registered USTs. USTs are regulated under Subtitle I of RCRA. The data comes from the Department of Environmental Quality. The database was searched to a 0.5-mile radius of the subject property. Over 150 underground storage tank (UST) sites are located within 0.5-mile of the project area. Fifty-seven UST sites are located within 0.25-mile of the existing DM&E right-of-way.

ERNS is a national database that stores information on releases of oil and hazardous substances. The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended - Section 103; Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) - Section 304; the Federal Water Pollution Control Act (Clean Water Act) - Section 311; and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) - Sections 300.51 and 300.65 have release notification requirements that are supported by ERNS. Seventeen ERNS sites were reported located within 1-mile of the proposed project area. Most of the ERNS reports are related to incidents on U.S. Highway 14. Table 4.1-16 provides a list of railroad-related ERNS in the project area.

Table 4.1-16 Railroad-Related ERNS Sites-South Dakota				
COUNTY	**CITY**	**RAILROAD**	**DATE**	**MATERIAL(S)**
Custer	Dewey	BN	11/04/94	Coal (25 cars)
Custer	Dewey	BN/SF	07/13/99	Locomotive (1) and Coal (4 cars)
Fall River	Edgemont	BN	02/16/93	Coal (22 cars)
Hughes	Pierre	DM&E	11/16/91	Clay (10)
Kingsbury	Lake Preston	DM&E	10/16/95	Locomotives (4) and Lumber (3 cars)
Pennington	Rapid City	DM&E	06/10/96	Clay (6 cars) and Chips (4 cars)

Table 4.1-17 is a list of South Dakota spill notification reports received by the Department of Environment and Natural Resources within a six month period that are within 1-mile of the proposed project area to provide a representation of the types of spills occurring.

Table 4.1-17 South Dakota Spill Notification Reports		
County	**Town/City**	**Material**
Beadle	Huron	Petroleum
Beadle	Huron	Gasoline
Hand	St. Lawrence	Atrazine
Hughes	Pierre	Triflurilan
Hughes	Pierre	Fertilizer
Kingsbury	Arlington	10-34-0 Fertilizer
Kingsbury	Lake Preston	Transformer Oil
Pennington	Wasta	Diesel Fuel
Pennington	Rapid City	Diesel Fuel

Table 4.1-17
South Dakota Spill Notification Reports

County	Town/City	Material
Pennington	New Underwood	Diesel Fuel
Pennington	Rapid City	Gasoline

CORRACTS is a list of RCRA facilities with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every facility that has had corrective action activity. No RCRA CORRACTS sites were identified.

4.1.12 ENERGY RESOURCES

Transportation of Energy Resources

During 1997 and 1998, DM&E transported a variety of energy resources. Many of which are associated with rural agricultural activities and where not transported in large quantities. Energy resources transported primarily include LPG. Occasionally and irregularly, fuel oil may be transported. However, less than 10 carloads of fuel oil would typically be moved annually.

Utilization of Energy Resources

DM&E currently transports approximately 60,000 carloads of materials annually. The operating limit for each rail car is approximately 263,000 pounds. As discussed in Chapter 1, this is below the present industry standard of 286,000 pounds per carload. However, based on a rail car weight of approximately 60,000 pounds and a loaded truck capacity of approximately 60,000 pounds, each DM&E railcar is the equivalent of approximately 3 trucks. Rail transportation is approximately 3 times more fuel efficient than trucks, making rail transportation, particularly for bulk commodities going long distances, a more energy efficient means of transportation. The ability of DM&E to provide transportation of goods for its existing shippers contributes to the efficient utilization of diesel fuel used both for locomotive and truck fuel. Additionally, DM&E transports a variety of energy resources as mentioned above. Rail transportation of these resources increases the efficiency of the usage of energy resources by reducing the energy required to provide the resources to the end user.

Recyclable Commodities

The only recyclable commodity currently transported by DM&E in South Dakota is scrap steel. Scrap steel is shipped on DM&E's rail line by scrap iron dealers. It is shipped to mills for reuse. In South Dakota, less than 100 carloads per year of scrap steel are typically shipped.

4.1.13 CULTURAL RESOURCES

The cultural history of South Dakota presented in this document provides a brief look at the extensive cultural history of the project area. It is not intended to be a full, comprehensive, and detailed look at the culture history of the area. It is only intended to give some context to the known resources and cultures that may be affected by this project. A short discussion concerning consultation with the Native American's that were known to occupy the project area is also included. Table 4.1-18 summarizes the pertinent portions of the culture history and was prepared from information contained in the *South Dakota State Plan for Archaeological Resources* (Winham and Hannus 1990) and a Plains culture history prepared by Dr. Richard Fox and Linea Sundstrom in an unpublished cultural resources management report (*Results of the 1999-2000 Phase I & II Cultural Resource Evaluation for the Dakota Minnesota and Eastern Corporations's Proposed Powder River Basin Expansion Project in South Dakota and Wyoming 2000*). The possible occupations before 13,000 years ago are presented in Chapter 3. They also apply to South Dakota and therefore will not be repeated here.

Humans have occupied the Great Plains of North America and the area of the proposed project for at least 13,000 years, possibly longer. The cultures occupying the Plains over the millennia can be classified into four categories; (1) nomadic hunter/gatherer, (2) nomadic foragers, (3) semi-sedentary villagers and (4) sedentary villagers.

The most common way of life on the Plains was that of the nomadic hunter/gatherer. They hunted large game animals as a rule but supplemented their subsistence with small mammals, fish and wild plants. The hunters/gatherers lifestyle persisted on the Plains from the earliest times into the Historic Period (Table 4.1-18).

Nomadic foragers primarily hunted small game and gathered fruits and wild plants. They on occasion augmented their subsistence with large game such as bear and deer. This lifestyle was the rarest on the Plains, but was practiced up to historic times.

Semi-sedentary villagers do not appear on the Plains until approximately AD 1. Their subsistence pattern included hunting and gathering that was supplemented by gardening. The practice of gardening required that for at least a part of the year the semi-sedentary villagers stayed in one general area while during the remainder of the year they were nomadic.

Sedentary villagers are defined as groups whose diet consisted of foods obtained roughly equally from agricultural products and hunting and gathering. These people lived in permanent villages which were normally located in forested river valleys. They would periodically venture onto the Plains to hunt, gather other resources. This lifestyle appeared in limited areas on the Plains around 900 AD and continued until historic times.

The cultural chronology of the northern Plains is nearly exclusively derived from radiocarbon dating techniques. As a general rule, according to this, one cultural period ends and is replaced by another. However, in reality one cultural period declines while another develops producing some overlap.

Table 4.1-18
Cultural Chronology of South Dakota

Period	Dates	Distinguishing Traits
Paleoindian Period	11,200 to 8,500/8,000 radiocarbon years before present (RCYBP)	Mainly recognized by distinctive Projectile point types such as Clovis, Folsom, Goshen, Hell Gap, Meserve, Cody, Agate Basin Scottsbluff, Eden and Dalton.
Archaic Period	8,500 to 1,500 RCYBP	Normally divided into Early, Middle and Late periods.
Early Archaic	8,500 to 7,000 RCYBP	Hawken and Hawken II projectile points. Indication of changes in subsistence strategies with a greater reliance on small game and wild plants to supplement large fauna.
Middle Archaic	7,000 to 2,500 RCYBP	Grinding stones, food preparation pits and round pit houses. McKean, Duncan and Hanna projectile points.
Late Archaic	2,500 to 1,500 RCYBP	A more systematic exploitation of bison than in the Middle Archaic and a tendency to reuse kill sites. Pelican Lake and Yonkee projectile points.

Table 4.1-18
Cultural Chronology of South Dakota

Period	Dates	Distinguishing Traits
Late Prehistoric	1,500 RCYBP to AD 1,600	Increase in population, highly organized and extensive bison kills and a reduction in projectile point size. Projectile points tend to be small and side-notched possibly indicating introduction of the bow.
Woodland	500BC to AD 900/950	Pottery, corner-notched projectile points and burial mounds. Semi-sedentary lifestyle and domesticated crops by as early as AD 250.
Plains Woodland	500BC to AD 900/950	Pottery, side-notched projectile points. Communal bison hunting and the use of a wide spectrum of food sources. Pottery and small scale horticulture (gardening) is developed. Evidence also includes corrals and jumps associated with antelope and bison hunting.
Plains Village	AD 800/900 to Historic (1874)	Permanent villages, intensive gardening, particularly along the forested river valleys. Includes the Middle Missouri Tradition and has been divided into three variants: Initial, Extended and Terminal. Initial variant contains Over, Mill Creek, Great Oasis and Cambria Phases.

Table 4.1-18
Cultural Chronology of South Dakota

Period	Dates	Distinguishing Traits
Protohistoric	AD1600 to 1874	Most of what is known comes from the accounts of EuroAmericans who were colonizing the periphery of the Plains. Some information also comes from Native American naratives and pictographic records. Tribes are for the first time identified. Sedentary tribal villages have been identified in the archaeological record. Protohistoric sites may be identified by the existence of Euro-American trade goods of metal, guns, decorative artifacts and the horse.
Historic Period	1870 to present	Native American sites may be identified by stone circles, villages and later by artifacts in association with EuroAmerican style dwellings. Fur trading posts, military camps as well as the remains of trails can be indicators of early commercial exploitation and military presence. Dugouts, foundations, cabins, outbuildings, cellars, fencing, wells, mining, trails, or family graves may be other indicators of historic archaeological sites.

Cultural resources, both historic and archaeological, are found throughout the project area and have the potential to be impacted by the proposed project. The project has two distinct parts generally described as; (1) reconstruction of existing rail lines and (2) new construction where rail lines currently do not exist. The Area of Potential Effect[2] (APE) differs for each of these parts. In consultation with the agencies and the State Historic Preservation Officers (SHPOs) the APE for the reconstruction portion is the existing DM&E right-of-way while the APE for the new construction portions is one mile either side of the proposed Extension Alternative.

Reconstruction Resources

A review of the site records held at the Archaeological Research Center, Rapid City, South Dakota indicated 11 archaeological sites are within or immediately adjacent to the existing DM&E right-of-way. Five of these sites date to the historic period, while six sites are prehistoric (Table 4.1-20). The oldest of the historic sites plotted near the rail line is the original Fort Sully (39HU52). Two of the remaining historic sites were related to small towns along the railroad corridor. One of the sites is the town of Vayland, South Dakota (39HD76). The other site contains the remains of what may be the depot and rail stop at Canning, South Dakota (39HU262). The function of the remaining historic sites is unclear (39HU134 and 39HU135).

Of the six prehistoric sites recorded along the existing right-of-way, four are village sites and two are of an undetermined site type. At least one of the villages, the Little Pumpkin site (39HU97), is late prehistoric or protohistoric. Two other villages date to the Plains Village stage (A.D. 900-1700), the Mush Creek site (39HU5) and the McClure Ranch site (39HU7). The age of the fourth village (39HU77) was not documented on the site form, but based on the chronology of the area it would likely be Plains Village pattern, similar to those described above. The two prehistoric sites of unknown function and size (39JN4 and 39HU133) also have an unassigned cultural affiliation.

There are 239 bridges and culverts (including 64 iron and steel bridges and stone box culverts, 148 open-deck timber pile spans and one cast concrete slab) along the existing rail line in South Dakota between Minnesota and Wall. Bridge No. 1500, a Pennsylvania through truss over the Missouri river is listed in the National Register (Appendix N). Additionally, there are 7

[2] Area of potential effects means the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The Area of Potential Efffect for the permitted or licensed alternative is fully described in the Programmatic Agreement and Identification Plan in Appendix J.

buildings that were inventoried (2 are listed in the National Register Nomination form for the Chicago & NorthWestern Roundhouse, Huron, South Dakota. There are 191 bridges that are recommended eligible for the National Register (Appendix N). The portion of the DM&E railroad that is included in the project from Winona, Minnesota to Wasta, South Dakota appears to be eligible for listing in the National Register as a linear historic district.

Table 4.1-19
Known Archaeological Sites in or Abutting the Existing Right-of-Way in South Dakota

Site Number	Site Name	Site Type	Cultural Affiliation	In ROW	Abut ROW	National Register Significance	Other Comments
39HU5	Mush Creek	Village	Middle Missouri	X		Eligible	Intact portions in ROW
39HU7	McClure Ranch	Village	Middle Missouri	X		Eligible	Not in ROW
39HU52	Fort Sully	Historic Fort	Euro-American		X	Eligible	Not in ROW
39HD76	Vayland	Historic	Euro-American	X		Not Eligible	Destroyed
39HU77		Village	Plains Village	X		Eligible	Destroyed in ROW
39HU97	Little Pumpkin	Village	Extended Coalescent	X		Eligible	Intact portions in ROW
39HU133		Lithic Scatter	Unknown Prehistoric		X	Not Eligible	Not in ROW
39HU134		Historic Scatter	Euro-American		X	Not Eligible	Destroyed in ROW
39HU135		Habitation	Euro-American		X	Not Eligible	Not in ROW
39HU262		Historic Scatter	Possible Depot and Whistle Stop in Canning, South Dakota	X		Not Eligible	Destroyed in ROW
39JN4		Lithic Scatter	Unknown Prehistoric		X	Not Eligible	Not in ROW

<u>New Construction</u>

Seventy known archaeological sites are within 1 mile of the proposed right-of-way /construction zone for Extension Alternative B. Fifty-nine of the sites are prehistoric, 9 of the sites are historic and 2 of the sites have both prehistoric and historic components. None of the sites are listed on the National Register. However, 6 of the sites are potentially eligible for listing in the National Register. One prehistoric site (39FA1240), classified as an artifact scatter, is located within the proposed right-of-way/construction zone. National Register of Historic Places (National Register) eligibility of 39FA1240 is undetermined. The information available on the remaining sites indicate that National Register eligibility is undetermined.

The following table is a compilation of the six known sites within one mile of the proposed right-of-way/construction zone that are potentially eligible for the National Register and may therefore be adversely affected.

Table 4.1-20
Known Potentially Eligible National Register Sites Within One Mile of Alternative B

Site #	Type	Historic/Prehistoric
39FA1248	Artifact Scatter	Prehistoric
39FA1249	Artifact Scatter	Prehistoric
39FA1250	Artifact Scatter	Prehistoric
39FA1251	Artifact Scatter	Prehistoric
39FA1252	Artifact Scatter	Prehistoric
39FA1299	Foundation	Historic

There are 96 known sites within 1 mile of the Modified Proposed Action, Extension Alternative C. Eight-three are prehistoric, 9 are historic and 4 have both prehistoric and historic components. Fifty-two sites are located within the proposed right-of-way/construction zone. Thirty-nine of the sites within the right-of-way/construction zone are prehistoric, 7 are historic, 1 contains both prehistoric and historic components and 6 contain unknown cultural components. Ten of the sites are not eligible for the National Register with 8 being prehistoric, 1 historic and 1 prehistoric/historic. One historic site is listed as potentially eligible for the National Register. The remaining sites are listed as unevaluated. Actions concerning these sites will be in accordance with the PA.

Alternative D has elements of both reconstruction and new construction. The alternative is reconstruction from Wall South, Dakota to Rapid City, South Dakota then to a point approximately 5 miles south of Smithwick, South Dakota. Alternative D then becomes new construction to the South Dakota-Wyoming State line. There are 71 known sites along Extension Alternative D in South Dakota. Of the known sites, 56 are prehistoric, 10 are historic, 2 have both prehistoric and historic, and 3 are of an unknown cultural affiliation. Four of the 71 sites are NRHP eligible. Only 9 of the known sites are within the existing right-of-way. All but one of the these sites are prehistoric and the other is historic, all are unevaluated for the NRHP. There are 130 bridges and culverts along the reconstruction portion of Alternative D, 110 are eligible for the NRHP. The bridges are open deck pile timber (83 total with 69 NRHP eligible), deck plate girder (19 total with 15 NRHP eligible), through plate girder (6 total with 5 NRHP eligible), through truss (2 total with both NRHP eligible), I-beam (4 total with 3 eligible), stone box culverts (all 11 NRHP eligible), stone arch culverts (all 3 are NRHP eligible), concrete arch culvert (1 total, NRHP eligible), and wooden box culvert (1 total, NRHP eligible). It is likely that other railroad related facilities (water stops, depots, freight houses, maintenance yards etc.,) would be considered eligible for the National Register if they are formally evaluated. None of the known archaeological sites are considered eligible for listing on the National Register.

Traditional Cultural Properties (TCP's)[3] are another category of cultural resources. They can be defined generally as properties eligible for inclusion in the National Register because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community (National Register Bulletin 38). Traditional cultural properties include a wide variety of site types. They may include such things as traditional camping or village sites, medicinal and spiritual plant collection areas, religious sites and cemeteries. No traditional cultural properties are known within the project area. However, the long period of occupation by Native Americans and the importance and sacredness of the area, especially the Black Hills, make it highly probable that such sites exist in the area. It is expected that some of the archaeological sites shall be eligible for the National Register as TCPs.

[3] A Traditional Cultural Property can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community. Examples include: 1) a location associated with the traditional beliefs of a Native American group about its origins, its culture history, or the nature of the world; 2) a location where Native American religious practitioners have historically gone and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural roles of practice; 3) a location where a community has traditionally carried out economic, artistic, or other cutural practices important in maintaining its historic identity.

Some cultural sites served specialized ceremonial functions. Examples include cemeteries, cairns, mounds and petroglyph and pictograph sites. These sites are often considered sacred and may have been important components of the religion of Native Americans. These sites may occur in conjunction with village or other habitation sites or may be isolated. The identification of sacred sites is often difficult archaeologically. According to the Handbook of American Indian Religious Freedom, Native Americans have historically observed the following as sacred sites:

- where the ancestors arose from the earth
- where the clan received its identity
- where one's ancestors are buried
- where the people receive revelation
- where the culture hero left ritual objects for the people
- where the people make pilgrimages and vision quests
- where the gods dwell
- where animals, plants, minerals, or waters with special powers are found (Vecsey 1991:222).

Additional categories for sacred sites have been added by Linea Sundstrom (1996:2), including:

- places frequented by the spirits of one's ancestors
- where esteemed members of a group died or were buried
- where miraculous or mythical events took place
- where ceremonies were held
- places recognized as sacred by other groups

Sacred sites found across the landscape can be of two types, general and specific. These places often included springs, round stones (especially in areas at some distance from streams and other water sources), fossil outcrops, or places with rock art or stone effigies (Sundstrom 1996). Important components of these sites may include the isolated nature of the area, natural uniqueness of the area and/or the vantage and viewshed the site provides. Although none of these sites are recorded within the project area, it is very likely that unknown sacred sites occur throughout the area.

Native American Issues

Native American occupation in the area of the proposed project has been well documented. It extends from prehistoric times to the present. Some of the early inhabitants of the project area were the Arapaho, Cheyenne, Kiowa, and Lakota Indians. Of particular significance to Native American people living in the project area is the Black Hills region. The

Black Hills were and are a sacred place used by Native Americans to purify themselves as well as a sanctuary of Tribal peace. Due to the historic occupation of the project area by various Native American peoples, the area is rich with cultural resources. Because impacts to cultural resources are expected, U.S. government to Tribal government (government to government) consultations with Federally recognized Tribes that have historic, aboriginal or current ties to the project area have been initiated and continue. Since traditional Tribal occupations did not observe current state boundaries, they were not considered when identifying Tribes appropriate for government consultation. Although there are unresolved treaty issues, no currently recognized tribal lands are affected by this project.

With the assistance of the cooperating Federal agencies, State Historic Preservation Officer (SHPO) in South Dakota, the cooperating agencies, Bureau of Indian Affairs and recommendations from individual Tribes, the Federally recognized Native American Indian Tribes with potential interest in the project area where identified. Consultation was initiated with these Tribes. Out of respect for cultural differences, the wisdom of elders and the historically unresolved issue of treaties, several tribal groups/organizations were also invited to participate in the consultation meetings. It is the intent of the consultations that each Tribe is provided a reasonable opportunity to participate with the NEPA process in addressing the potential impacts of the proposed project. To date, these consultations have resulted in the preparation of a Programatic Agreement (PA)[4] for the treatment of cultural resources and a Memorandum of Agreement (MOA) outlining Native American participation in the NEPA process (Appendix I).

In September of 1998 and February 1999, letters were sent to the Chairman (and any known cultural resource contact) of each of the identified potentially interested Tribes. These letters outlined the proposed project and requested their participation in consultation. Only two responses were received. In February and March of 1999, contact was made by telephone with each Tribal government to explain the request for consultation and the issues. Each Tribe was asked to appoint traditional and or cultural representatives to represent the Tribe in the consultation efforts.

The consultations to date have consisted of 1) two inter-Tribal meetings to address Tribal participation in the process; (National Historic Preservation Act (NHPA) Section 106 process and to jointly develop a Memorandum of Agreement between the Tribes, the Surface Transportation Board and DM&E;) 2) several smaller meetings with Tribal representatives; 3) personal appearances before Tribal culture committees, elder groups, council chairman and individual

[4] A programic Agreement means a document that records the terms and conditions agreed upon to resolve the potential adverse effects of a Federal agency program, complex understanding or other situation.

4.1.15 ENVIRONMENTAL JUSTICE

Executive Order No.12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs individual Federal agencies to develop approaches that address environmental justice concerns. Although the Order does not require independent agencies such as the Board to conduct environmental justice analyses, potential environmental justice issues were raised during the scoping process. SEA conducted an investigation of potential environmental justice issues because:

- the President requested that agencies comply with the Order, particularly during the NEPA process.

- the Council on Environmental Quality (CEQ) guidance and the draft Environmental Protection Agency (EPA) guidance on environmental justice emphasize addressing environmental justice concerns in the NEPA context.

- the Board is responsible for ensuring this project is consistent with the public interest.

- environmental justice concerns were raised during the scoping process.

The purpose of Executive Order No. 12898 is to identify and address disproportionately high and adverse impacts to minority and low-income populations potentially occuring due to agency actions. SEA investigated whether potential environmental justice communities were present within the project area. Census information was obtained for each county within the project area. For organizational purposes, individual counties are divided into census tracts and census tracts into census block groups. Statistical information at the census block level was obtained and reviewed for those census block groups through which the existing rail line passes, are immediately adjacent to the existing rail line, or would be crossed by any of the Extension Alternatives. Individual census block groups were determined to potentially be minority or low income based on criteria developed by the EPA and SEA. These criteria are:

- at least one-half of the census block group is of minority status

- at least one-half of the census block group is of low-income status

- the percentage of minority status for the census block group is at least 10 percentage points higher than for the entire county in which the census block group is located council members; and, 4) treaty commissions. Throughout the process Tribal representatives have been frequently consulted by phone.

The substantive participation of Tribal representatives to address a broad range of Tribal concerns has resulted in a draft Memorandum of Agreement (MOA) developed jointly between the Tribes, the Surface Transportation Board, and DM&E Railroad. For cultural resource issues, a draft Programmatic Agreement (PA) which includes Identification plans (ID Plans) offering Tribes substantive participation in the decision making process under the National Historic Preservation Act (NHPA) Section 106 (Appendix J) has been prepared.

Continuing Tribal consultations include; 1) opportunity for an on-site review of the proposed new construction area; 2) opportunity to discuss the archaeological survey work and offer recommendations; 3) inter-Tribal meeting after release of the Draft EIS to discuss any areas of concern and recommendations on the draft; 4) individual or small group meetings on an as needed or as requested basis.

Indian Trust Assets

Indian Trust Assests (ITA) are properties, interests, or assets of a Native American Tribe or individual over whom the Federal government has an interest through administration or direct control. Examples include lands, minerals, and timber, as well as water rights, hunting rights, fishing rights, and other treaty rights. The sovereignty of Tribes and the trust relationship with the Federal government have been established and validated through treaties, court decisions, legislation, regulations, and policies.

The Native Americans have raised concerns for a number of ITA's. These include wildlife, fisheries, vegetation, paleontological resources, cultural resources, and water quality. Additionally, concerns about culturally important plants have been voiced during consultation meetings with the Tribes. The Tribes are concerned that the planned construction would make changes in or destroy the local abundance and distribution of plants traditionally used by the Tribes. Consultation is continuing over issues the Tribes have concerning culturally important.

4.1.14 SOCIOECONOMICS

The social and economic study area in South Dakota includes the following 13 counties: Brookings, Kingsbury, Beadle, Hand, Hyde, Hughes, Stanley, Jones, Haakon, Jackson, Pennington, Custer and Fall River.

4.1.14.1 Population and Demographics

The project area is located in primarily rural areas of the above listed counties. The rebuild of the existing DM&E rail line originates in eastern Brookings County, southeast of Elkton at the South Dakota/Minnesota state line. The rebuild in South Dakota terminates in Wall, South Dakota in Pennington County. Table 4.1-21 lists the communities, from east to west, and their populations in the project area.

Table 4.1-21
Potentially Affected Communities and Populations-South Dakota

COMMUNITY	POPULATION	COMMUNITY	POPULATION
Elkton	602	Highmore	835
Aurora	619	Holabird	NA
Brookings	16,270	Harrold	167
Volga	1,263	Blunt	342
Arlington	908	Canning	NA
Hetland	53	Alto	83
Lake Preston	663	Pierre	12,906
De Smet	1,172	Ft. Pierre	1,854
Manchester	136	Wendte	NA
Iroquois	328	Capa	NA
Cavour	116	Midland	233
Huron	12,448	Nowlin	NA
Wolsey	442	Powell	37
Wessington	265	Philip	1,077
Vayland	NA	Cottonwood	12
St. Lawrence	223	Quinn	72

Table 4.1-21
Potentially Affected Communities and Populations-South Dakota

COMMUNITY	POPULATION	COMMUNITY	POPULATION
Miller	1,678	Wall	834
Ree Heights	91	Wasta	82

NA - Information not available
1990 data from United States Census Bureau

Tables 4.1-22 through 4.1-28 show population, income and employment numbers for the affected counties and for the State of South Dakota.

The population of the State of South Dakota increased between 1986 and 1994 by 2.2 percent (Table 4.1-24). The populations of 3 South Dakota counties (Brookings, Hughes and Pennington) also increased during this same time by 7.2 percent, 4.4 percent, and 12.6 percent respectively (Table 4.1-24). The average decrease in the remaining ten counties was 8.4 percent. Between 1984 and 1990, the State saw a 19.5 percent increase in the minority population while Pennington County saw an increase of 55.3 percent (Table 4.1-24). A percent increase could not be calculated for 11 of the 13 counties because of the absence of 1988 minority population information.

4.1.14.2 Employment and Income

Per capita income increased greatly in the short time between 1985 and 1989. The average increase of the affected counties was 44.9 percent, whereas the increase in the entire state was only 24.6 percent (Table 4.1-24). The State of South Dakota saw large changes in median income, ranging from 43.5 percent increase to 90.2 percent increase.
The average increase of median income, at 64.5 percent, was below the State's increase of 71.0 percent (Table 4.1-24).

The percent of persons living below the poverty level decreased in the state between 1979 and 1989. In Kingsbury, Beadle, Hand, Hyde, Stanley, Haakon, Jackson, Custer, and Fall River counties that number also decreased; while Brookings, Hughes, and Pennington counties saw an increase in the percent of persons living below the poverty level. The average increase for these three counties was 27.2 percent (Table 4.1-24).

The unemployment rate decreased in the State of South Dakota in all but one county (Custer County) in the project area between 1986 and 1994. Custer County, had an unemployment rate increase of 11.4 percent (Table 4.1-24).

4.1.14.3 Public Services and Fiscal Condition

There are many public services offered to area residents. Nearly all communities have elementary, middle and senior high schools. Many of the communities have clinics and/or doctor and dentist offices. However, many of the communities do not have hospitals. Nearly all of the communities offer recreational facilities and churches. Some of the smaller communities have volunteer fire departments and rely on county sheriffs for public protection services. Most of the communities provide water and waste water services for their residents.

All of the communities potentially affected by the new construction have small populations. Most communities have only one elementary, middle and senior high schools and many of the small communities bus the children to larger communities or rural schools. There are churches in the area as well.

Table 4.1-22
1996 Statistical Information for Potentially Affected Counties - South Dakota

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[3]	Percent below poverty level[3]	Unemployment Rate[1]	Acreage in Farmland (1,000)[4]	Number of Farms[4]	Average Size of Farms (acres)[4]
South Dakota	723,655	9.2	10,661	22,503	15.9	3.3	44,828	34,057	1,316
Brookings	26,368	2.5	9,926	21,807	17.8	2.7	444	959	463
Kingsbury	5,766	0.4	9,857	20,290	13.5	3.8	460	614	749
Beadle	18,105	2.2	10,373	22,425	13.2	2.6	725	813	891
Hand	4,210	0.8	9,305	19,310	17.6	2.4	861	542	1,589
Hyde	1,660	4.0	9,648	19,907	16.5	2.7	545	240	2,271
Hughes	15,556	8.1	12,263	27,058	10.4	2.2	391	256	1,526
Stanley	2,676	6.8	10,759	22,321	12.4	3.2	904	198	4,566
Jones	1,308	0.7	9,592	21,202	15.1	3.2	584	198	2,951
Haakon	2,528	2.6	10,117	21,166	13.6	3.2	1,204	321	3,752
Jackson	2,888	43.2	6,947	17,246	38.8	5.1	1,361	327	4,162
Pennington	86,585	12.7	12,031	25,340	12.9	3.6	1,066	636	1,676
Custer	6,616	3.6	10,942	22,662	12.4	4.3	462	323	1,431
Fall River	7,108	9.0	10,944	20,483	14.5	3.8	975	298	3,271

1996 County and City Extra, Annual Metro, City and County Data Book. Edited by Courtenay M. Slater and George E. Hall. Berman Press, Lanham, MN, 1996.
[1] 1994 Data; [2] 1990 Data; [3] 1989 Data; [4] 1992 Data

Table 4.1-23
1988 Statistical Information for Potentially Affected Counties - South Dakota (1970's and 1980's data)

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[4]	Percent below poverty level[4]	Unemployment Rate[1]	Acreage in Farmland (1,000)[5]	Number of Farms[5]	Average Size of Farms (acres)[5]
South Dakota	708,000	7.87	8,553	13,156	16.9	4.7	43,811	37,148	1,179
Brookings	24,600	0.9	8,205	13,597	17.4	6.0	443	1,060	418
Kingsbury	6,300	NR	7,983	10,666	20.1	5.1	479	722	663
Beadle	18,300	NR	9,014	13,398	14.0	3.9	737	874	843
Hand	4,700	NR	5,959	10,352	28.4	2.7	866	630	1,375
Hyde	1,900	NR	6,012	11,812	23.2	4.0	544	237	2,297
Hughes	14,900	NR	10,229	17,458	7.1	3.7	366	252	1,453
Stanley	2,700	NR	5,930	14,807	13.0	4.7	861	167	5,154
Jones	1,500	NR	6,689	11,835	18.3	4.1	540	222	2,434
Haakon	2,800	NR	4,938	12,076	20.6	3.9	1,208	322	3,752
Jackson	3,400	NR	3,683	12,172	35.6	4.7	1,250	282	4,432
Pennington	76,900	9.21	10,170	14,890	12.2	4.6	1,076	577	1,865
Custer	6,900	NR	8,336	15,166	13.5	3.7	418	302	1,384
Fall River	7,800	NR	9,147	14,274	18.5	4.2	1,002	336	2,982

1988 County and City Data Book, U.S. Department of Commerce Bureau of the Census. U.S. Government Printing Office, 1988.
[1] 1986; [2] 1984; [3] 1985; [4] 1979; [5] 1982
NR = Not Reported

Table 4.1-24
Comparison of Statistical Information for Potentially Affected Counties - South Dakota

Affected Area	Population Change	Percent Minority Change	Per Capita Income Change	Median Income Change	Percent below poverty level Change	Unemployment Rate Change	Acreage in Farmland (1,000) Change	Number of Farms Change	Average Size of Farms (acres) Change
South Dakota	2.2	19.5	24.6	71.0	-3.8	-28.2	2.3	-8.3	11.6
Brookings	7.2	197.7	21.0	60.4	9.7	-51.8	0.2	-9.5	10.8
Kingsbury	-8.5	NA	23.5	90.2	-38.5	-31.8	-4.0	-15.0	13.0
Beadle	-1.1	NA	15.1	67.4	-6.7	-34.0	-1.6	-7.0	5.7
Hand	-10.4	NA	56.2	86.5	-44.5	-20.4	-0.6	-14.0	15.6
Hyde	-12.6	NA	60.5	68.5	-37.9	-41.0	0.2	1.3	-1.1
Hughes	4.4	NA	19.9	55.0	52.9	-37.9	6.8	1.6	5.0
Stanley	-0.9	NA	81.4	50.7	-5.5	-32.5	5.0	18.6	-11.4
Jones	-12.8	NA	43.4	79.1	-28.0	-31.9	8.1	-10.8	21.2
Haakon	-9.7	NA	104.9	75.3	-40.4	-25.9	-0.3	-0.3	NC
Jackson	-15.1	NA	88.6	41.7	-7.4	-7.8	8.9	16.0	-6.1
Pennington	12.6	37.9	18.3	70.2	19.1	-11.9	-0.9	10.2	-10.1
Custer	-4.1	NA	31.3	49.4	-11.9	11.4	10.5	7.0	3.4
Fall River	-8.9	NA	19.6	43.5	-28.6	-17.6	-2.7	-11.3	9.7

NA - Not Available/NC - No Change

Table 4.1-25
County Assessed Value and Taxes Collected-South Dakota

County	Market Value			Collected Taxes		
	1996 or 1999*	1997	1998	1996 or 1999	1997	1998
Brookings	798,783,081*	731,217,650	758,178,852	18,884,902*	17,667,412	18,692,300
Kingsbury	263,088,716*	236,205,643	262,841,857	1,011,896	1,064,307	1,102,533
Beadle	560,968,012	573,061,756	599,332,717	13,520,893	14,199,907	14,522,048
Hand	239,411,171	232,966,441	269,247,702	4,064,083	4,173,086	4,325,005
Hyde	87,858,279	98,913,675	98,405,097	1,708,168	1,881,410	2,029,048
Hughes	575,650,876	593,558,310	627,024,285	11,516,089	11,841,751	11,848,355
Stanley	194,599,396*	153,462,174	168,218,381	2,575,804	2,764,032	2,682,083
Jones	94,342,166	91,678,038	93,563,851	1,467,164	1,422,769	1,474,117
Haakon	155,570,980	164,299,079	258,698,852	2,290,386	2,317,204	2,172,341
Jackson	108,976,730	119,490,721	121,291,084	1,748,383	1,577,426	N/A
Pennington	2,274,962,043	2,481,299,223	2,651,199,494	10,290,405	12,210,656	12,756,255
Custer	286,000,000*	N/A	260,885,920	5,279,588*	N/A	5,279,588
Fall River/Shannon	185,063,090	204,176,602	217,077,131	5,801,305	6,154,617	6,033,614

- the percentage of low-income status for the census block group is at least 10 percentage points higher than for the entire county in which the census block group is located.

Based on an assessment of the rebuild portion of the project, 20census block groups were identified as potential environmental justice communities in South Dakota. Twelve block groups are located in Brookings County, 1 in Beadle County, 1 in Hyde County, 5 in Hughes County, and 1 in Jones County. Of the above census block groups, 19 were identified because their percentage of low income populations exceeded the low income populations in their respective counties by 10 or more percentage points. One of these census block groups in Hughes County was also identified because the percentage of its minority population exceeded the minority population for the county by 10 or more percentage points. The remaining census block in Hughes County met the criteria for environmental justice due to its percentage of low income populations exceeding low income populations in the county by 50 or more percentage points.

Based on an assessment of the new build portion of the project, 12 census block groups were identified as potential environmental justice communities in South Dakota. Ten census blocks identified as environmental justice communities are in Pennington County. Of these, 3 were identified as potential environmental justice communities because the percentage of their low income populations exceeded the low income population for the county by 10 or more percentage points. Three were identified as potential environmental justice communities because the percentage of their minority populations exceeded the minority population for the county by 10 or more percentage points. Four census block groups were identified as potential environmental justice communities because both the percentages of low income and minority populations exceeded the low income and minority populations for the county. One census block group in Shannon County was identified as a potential environmental justice community because at least 50 percent of the population was minority and at least 50 percent meet the criteria for poverty. One census block group in Custer County was identified as a potential environmental justice community because the percentage of its low income population exceeded the low income population for the county by 10 or more percentage points.

4.1.16 RECREATION

Recreational opportunities are abundant within the project area. Many of these opportunities center on the numerous fishing and hunting areas in the project area. Also, state, county and city parks provide numerous opportunities for recreation. A detailed description of these areas is dicussed in Section 4.1.4.8.

In Brookings County there are several parks. There is a “roadside park” approximately two miles north of the rail line and approximately two miles northeast of Aurora. There are four parks within 0.5 mile of the rail line in Brookings. Hillcrest Park is in east Brookings, Sexauer Park is in northwest Brookings, Pioneer Park is in west Brookings and an unnamed park is in southwest Brookings.

There are four unnamed parks within 0.5 mile of the existing DM&E rail line in Kingsbury County. The first park is just southeast of Arlington and the second is just southeast of Lake Preston. The last two are northwest and west of De Smet. Finally, the Lake Iroquois campgrounds are one mile south of the rail line and one mile southeast of the town of Iroquois.

There are five parks in Huron, Beadle County, that are all within 0.5 mile of the existing DM&E rail line. An unnamed park and Winter Park are both in central Huron. Ravine Park is in northeast Huron, Riverside Park is just east of Huron and Prospect Park is in southeast Huron.

A city park in Hand County, is approximately 0.5 mile north of the rail line, on the northwest side of Miller.

In Hughes County there is a “roadside park” just north of the rail line less than 2.5 miles northeast of the town of Blunt. Antelope Creek Recreation Area, approximately six miles southeast of Pierre, is on the south side of the river. West Shore and Tailrace Recreation Areas, near Oahe Dam, are approximately five miles northwest of Pierre.

There is a “roadside park” just south of the rail line and approximately 0.25 mile west of the Pennington-Jackson County line.

There are several hiking and bicycle trails in the project area. The Missouri River Trail at the Farm Island Recreation Area offers 10 miles of paved routes. These routes offer waterfront views from wooded shorelines. The La Framboise Island National Recreation Trail is in Pierre. This trail offers 8 miles of hiking trails and 10 miles of biking trails. These trails are gravel or hard-packed dirt trails on the quiet island. From these trails abundant waterfowl can often be observed. The Cottonwood Path in Ft. Pierre offers 0.4 mile of hiking trails. These trails are level sand and gravel nature trails through the Missouri River wetlands.

4.1.17 AESTHETICS

4.1.17.1 Visual Resources

As discussed in Section 4.4.18 streams and rivers with scenic or wilderness characteristics still in their free-flowing condition may be designated as Wild and Scenic under the National Wild and Scenic Rivers Act of 1968 (P.L. 90-542;16 U.S.C. 1271-1287) to protect the natural qualities they provide. A portion of the project area that would be crossed by the Extension Alternatives contains an eight mile section of the Cheyenne River, between the community of Red Shirt and its confluence with Battle Creek, considered by the USFS to be eligible for designation as Wild and Scenic.

Aesthetic resources, resources that have a pleasing appearance or effect, in the project area are quite variable. The project area contains regions of little or no human disturbance, and areas of urban build-up. Landscapes range from rugged rock formations with canyons and gulches such as is found in Badlands National Park, to the pine covered rolling hills of the Black Hills National Forest, and the open grasslands and prairies of the Buffalo Gap National Grasslands (BGNG). Scenic drives and trails are located within these natural areas. However, views of similar formations and terrain are possible at many locations throughout the area.

The Historic Prairie, including all of South Dakota, consists of a patchwork of farmlands scattered with historic towns and was the home of the Dakota Indians. The area is generally open, with few trees except for along some streams and rivers and where planted for fencerows and windbreaks and as small woodlots around farmsteads. In eastern South Dakota, the green agricultural fields and trees of spring and summer turn to a mix of colors in fall and large areas of open snow fields in the winter. In central South Dakota, the rolling hills and bluffs of the Missouri River area provide scenic beauty with the contrasts of the river, drier open grasslands and tree-covered slopes and bluffs. Western South Dakota consists primarily of grasslands and open rangeland. However, the drainages in the area have cut deep channels and wide floodplains, with steep sideslopes. Slopetops are generally wide, flat tables. High points in the area can provide spectacular views for great distances, often with little or no evidence of human occupation or development. No established scenic overlooks or vantage points are known in the areas outside the Black Hills and Badlands National Park. However, many parts of the project area are considered scenic by residents and area visitors.

Of the areas containing valuable scenic settings, only those under the management of the USFS have visual management objects. Under the current USFS grassland plan lands on the BGNG have been assigned a visual quality management object (VQO). VQO's are used to define acceptable degrees of alteration of the natural landscape. Approximately 80-90 percent of the

USFS land potentially affected by the project have a modification VQO which allows for relatively large changes in the visual contrast. However, facilities constructed in these areas are required to use materials and methods which would minimize their contrast with the surrounding landscape. The remaining 10-20 percent of USFS lands in the project area have a partial retention VQO. Partial retention VQO's are normally reserved for riparian corridors and other bodies of water. Development in areas with a partial retention VQO is restricted to activities which would not attact the attention of the casual observer.

Under the proposed USFS grassland management plan, scenic integrity levels (SIL) ranging from high to low are assigned to all proposed management areas. A high SIL indicates that human activity is not scenically evident, a moderate SIL indicates that valued landscape character appears slightly altered, and a low SIL indicates that valued landscape character appears moderately altered. For the proposed project area, SIL's are are mostly in the moderate to low range. Only approximately 10 percent of the potential project area would have a high SIL rating.

4.1.17.2 Nightlights

Nightlights exist throughout the area, most often associated with farmsteads, in the rural parts of the project area and concentrated in the communities and cities along the rail line. Lighting includes streetlights, dusk to dawn lighting and other security lights for farms, businesses and other facilities to provide security and safety. Due to the rural and undeveloped nature of the area, particularly in western South Dakota, night lights are widely scattered and, in some areas, not visible to the night time observer. Such lack of light pollution contributes to a feeling of seclusion and remoteness, as well as enabling better viewing of the night sky.

* * * * *

4.2 WYOMING - EXISTING CONDITIONS

The proposed project area in Wyoming includes the following counties: Niobrara, Weston, Campbell, Crook and Converse. These five counties are located in the northeast quarter of Wyoming. The following is a general summary of the natural and human resources that currently exist in these counties.

4.2.1 CLIMATE

The project area is in the northeastern portion of Wyoming. The area features four distinct seasons. They are cold winters and mild summers, with spring and fall acting as transitional periods. The climate is essentially uniform for the entire project area, however, differences in vegetation, soil materials and relief can cause variations in the microclimate. Average winter temperatures in the project area are about 25 degrees Fahrenheit, while average summer temperatures are near 70 degrees Fahrenheit. The average low temperatures in the winter are around 12 degrees Fahrenheit and the average high temperatures in the summer is about 80 degrees Fahrenheit. Average precipitation ranges from 11 to 14 inches. Of the average annual precipitation in the project area, 79 percent usually falls during the growing season, April to September. Table 4.2-1 summarizes climatic conditions for the counties in the project area.

Table 4.2-1
Summary of County Climatic Conditions

County	Coldest Month/Average Daily Maximum Temperature (degrees Fahrenheit)	Warmest Month/Average Daily Maximum Temperature (degrees Fahrenheit)	Average Annual Precipitation (inches)	Average Snowfall (inches)	Wettest/ Driest Month
Niobrara	January/20.8	July/72.9	14.32	42.6	May/January
Weston	January/22.9	July/73.0	14.10	37.1	June/January
Campbell	January/21.3	July/70.8	15.61	56.5	June/February
Crook	January/19.1	July/70.4	13.24	35.4	May/January
Converse	January/23.4	July/73.3	12.30	N/A	May/February

N/A - Not Available
University of Wyoming, 1999

4.2.2 TOPOGRAPHY

Nearly all of the project area in Wyoming occurs in the southern part of the northern rolling high plains. The area is at the southern end of the Powder River Basin (PRB) which is between the Casper Arch and the Big Horn Mountains to the west and the Black Hills to the northeast. This area is underlain by interbedded sandstone and shale. The topography generally consists of buttes, rolling hills, mountains and plains dissected by streams (Ensz, 1990; Nieslen, 1996; USGS, 1964).

Drainage in the project area generally runs to the southeast and east. Most surface water drains to numerous streams, creeks or ponds, which in turn drain to rivers. The main rivers these streams and creeks drain into are the Cheyenne River in the northern and eastern part of the project area, the North Platte River in the southern portion and the Powder River in the extreme northwestern corner of the project area. Most of the tributaries to the major rivers are intermittent, flowing only at snow melt or rainfall events.

4.2.3 GEOLOGY AND SOILS

The geology of the region is dominated by a large synclinal structure (folded rock layers forming a concave upward shape) known as the PRB. The PRB runs southeast/northwest and covers most of Campbell and Converse counties and the western parts of Weston and Niobrara counties (Love, 1955).

Due to the synclinal nature of the PRB, stratigraphic units (sedimentary rock layers) also trend southeast/northwest. Bedrock geology of the PRB consists primarily of Tertiary (1.8-65 million year old) and Cretaceous (65-140 million year old) sandstones, shales and coals. Dark-gray marine shale of the Pierre formation is the eastern most unit of the PRB and is located in eastern Weston and Niobrara counties. Light colored sandstone and gray sandy marine shale of the Fox Hills formation, borders the Pierre shale and is also found in eastern Weston and Niobrara counties. Brown and gray sandstone and shale containing thin coal beds of the Lance formation are found in central Weston and Niobrara counties. Light-colored massive sandstone, drab-colored shale and coal of the Fort Union formation is located in western Weston and Niobrara counties and eastern Campbell and Converse counties. Drab-colored claystone and shale, sandstone and numerous coal beds of the Wasatch formation form the center of the PRB and dominate the majority of Campbell and Converse counties (Love 1955).

Bedrock geology east of the PRB, in southeastern Weston and northeastern Niobrara Counties, is a complex interbedding of claystones, shales, siltstones, sandstones and limestone (Love and Christiansen 1985).

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4.2.3.1 Unique Geological Formations

Unique geologic formations are considered to be uncommon, unusual and or containing characteristics or qualities that make them of interest to science or the general public. Known geologic features unique to this region include surface outcrops of zeolite (highly absorbent mineral), bentonite (volcanic ash) and gypsum (chalk-like mineral) present in southern areas of Weston County. Surface outcrops of coal are present in central and south-central parts of Campbell County and northern parts of Converse County. A portion of the Lance Creek Fossil Area in Niobrara County is located within the project area. The Lance Creek Fossil Area contains exposed areas of the Lance formation. The late Cretaceous, Lance Creek Formation is known to contain fossil vertebrates such as *Tyrannosaurus rex*, Triceratops, duck-billed dinosaurs, and various fossil fish. The Lance formation also contains a wide variety of fossils including snails, clams, and tropical plants. The Lance Creek Area is considered a highly significant geological area.

4.2.3.2 Soil Types and Characteristics

<u>Niobrara, Weston, Campbell, Crook and Converse</u>

Soils in these counties generally formed from weathered shale, sandstone, siltstone and limestone. Organic matter is slow to accumulate and fertility is low. Soils in this region are classified as: 1) entisols; 2) alfisols; 3) mollisols and; 4) aridisols. Table 4.2-2 provides the characteristics of these soils.

Table 4.2-2
General Soil Characteristics

Soil Type	Location	Characteristics
Entisol	steep slopes, alluvial basins	shallow to deep, nearly-level to very steep, well-drained, clayey to sandy loam. Concerns: low-strength, shrink-swell, frost action
Alfisols	uplands	gently sloping to very steep slopes, shallow to deep, well-drained, sandy loam. Concerns: slope and large stones
Mollisols	uplands and side slopes	nearly-level to strongly sloping, deep, well-drained, sandy loam. Concerns: frost action
Aridisols	moderate to steep sloped uplands	moderate to steep slopes, shallow to moderately deep, well-drained, clay, formed from weathered shale and crack up to two inches wide during dry periods. Concerns: shrink-swell, frost action

Niobrara, Weston, Campbell, Crook and Converse

The following (Table 4.2-3) sumarizes the soil associations and their characteristics found in the proposed project area.

Table 4.2-3
Wyoming Soil Associations Along the DM&E Extension Alternatives

County	Association	Description
Weston	Shingle-Forkwood-Cushman	Shallow to deep, well-drained, nearly level to steep soils; on uplands, alluvial fans and toe slopes. Concerns: Erosion
	Terro-Forkwood-Tassel	Shallow to deep, well-drained, gently sloping to rolling soils; on uplands, alluvial fans and ridgetops. Concerns: Wind erosion
	Savageton-Absted-Bahl	Moderately deep and deep, well-drained, nearly level to moderately sloping soils; on foot slopes and alluvial fans. Concerns: None described
	Haverdad-Bidman-Clarkelen	Deep, well-drained, nearly level to gently sloping soils; on floodplains, low terraces and small alluvial fans. Concerns: Wind erosion
Campbell	Wags-Hilight-Wibaux	Moderately deep and well-drained, fine textured soils that formed on terraces and escarpments. Concerns: Water erosion and droughtiness
	Wibaux-Teckla-Turnercrest	Deep and somewhat excessively-drained, medium to moderately coarse textured soils formed on hills and terrace breaks. Concerns: Erosion and Droughtiness
	Clarkelen-Absted	Very deep and well-drained, moderately coarse textured soils that occur on floodplains. Concerns: Water Erosion

Table 4.2-3
Wyoming Soil Associations Along the DM&E Extension Alternatives

County	Association	Description
Niobrara	Bahl-Petri-Grummit	Shallow and very deep, well-drained, nearly level to very steep on alluvial fans, terraces, hills, ridges and dip slopes. Concerns: Droughtiness and salinity
	Haverdad-Clarkelen-Draknab	Very deep, well-drained, nearly level to gently sloping soils on floodplains and stream terraces. Concerns: None described
	Kishona-Forkwood-Theedle	Moderately deep to very deep, well-drained, nearly level to steep soils on alluvial fans, terraces, hillsides dissected drainageways and ridges. Concerns: None described
Converse	Tassel-Hiland-Vonalee	Shallow and deep, well-drained and somewhat excessively drained, undulating to hilly soils; on uplands. Concerns: Erosion
	Shingle-Cushman-Bowbac	Shallow and moderately deep, well-drained, rolling and hilly soils; on uplands. Concerns: Wind erosion
	Hiland-Shingle-Ulm	Deep and shallow, well-drained, nearly level to hilly soils; on uplands and adjacent foot slopes, toe slopes and alluvial flats. Concerns: Erosion
Crook	Bidman-Razor-Winter	Very Deep to deep, moderately steep loamy and clayely soils formed from shale. Concerns: Erosion
	Shingle-Fort Collins-Cushman	Shallow to deep, gentle sloping to steep, loamy soils formed from sandstone/shale. Concerns: Erosion
	Haverson-Lohmiller-Glenburg	Very deep, nearly level, loamy soils found along floodplains and terraces. Concerns: None described

4.2.3.3 Geologic Hazards

This description covers the seismic activity in the vicinity of the proposed railroad. The United States Geological Survey (USGS) presents seismic data as the level of horizontal shaking that has a 1-in-10 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of gravity (g) (acceleration of a falling object due to gravity). For example, a shaking level of 0-2percent indicates there is a 10percent (1-in-10) chance of experiencing a shaking force exceeding 0-2percent of the force of gravity in a 50-year period. Gravitational forces of 2-4 percent could be felt by some people, but would not likely cause any structural damage.

Based on the 1996 United States Geological Survey Shaking Hazard Maps, all the counties in the project area have a 1-in-10 chance of experiencing a force of 2-4 percent of g within a 50 year period (USGS Shaking Hazard Maps 1996).

In Wyoming, portions of the Extension Alternatives would cross the Pierre Shale and Fort Union formations. These formations are highly susceptable to landslides (Radbruch-Hall *et al.* 1976). The clay-mineral content of these rocks is moderate to high making them susceptable to slumps, particularly in valleys with steep walls such as along the Cheyenne River and its tributaries.

4.2.3.4 Prime Farmland

Prime farmland is one of several kinds of farmland defined by the U.S. Department of Agriculture (USDA). It is important in meeting the Nation's needs for food and fiber. Because prime farmland is limited, the USDA recognizes the importance of wisely using this resource. Prime farmland is defined as land that is best suited to food, feed, forage, fiber and oilseed crops. It may be cultivated land, pasture, woodland or other land. Prime farmland produces the highest yields with minimal inputs of energy and economic resources and farming this land results in the least damage to the environment.

In general, there is very little prime farmland in the study counties in Wyoming. Furthermore, what is considered prime farmland must be irrigated in order for it to meet that designation. In Weston County, a maximum of 1.5 percent of land would meet the requirements for prime farmland if an adequate and dependable supply of irrigation water were available. Niobrara County has a maximum of 6.4 percent prime farmland. The southern part of Converse County contains a mere 0.1 percent and this must be irrigated. The northern part of Converse County along with Campbell and Crook counties do not contain any prime farmland.

Table 4.2-4
Prime Farmland

Area	Percentage of Acreage
Weston	1.5
Niobrara	6.4
Campbell	0.0
Converse (northern)	0.0
Crook	0.0
NRCS 1999	

4.2.3.5 Paleontological Resources

Paleontological resources in the project area of Wyoming are similar to those found in western South Dakota and are described in Section 4.1.3.5. A variety of fossil plants and animals bearing geological formations occur throughout the area.

The Brule and Chadron exposures, described in Section 4.1.3.5, occur at various localities in the western extreme of the project area in Campbell County. *Paleocene* taxa within the Tongue River, Lebo and Tullock formations are terrestrial, lacustrine and marginal marine in origin and are characterized by mammals, sharks, champsosaurs, crocodiles, fish, invertebrates, plants and petrified wood. These Paleocene sedimentary deposits are collectively referred to as the Fort Union Group and they occur in the area through which the Extension Alternatives would extend to reach the Powder River Basin in eastern Wyoming. The Pierre Shale is a widespread unit occurring throughout much of the project area, including northeastern Niobrara County, Wyoming. Terrestrial and near-shore sediments of the Lance Formation occur in eastern Wyoming. The Lance Creek Formation, Sections that occur within Thunder Basin National Grassland, have a high potential to produce a large variety of fossils of excellent research value (Section 4.2.3.1).

4.2.4 LAND USE

Each of the five counties in the project area, Niobrara, Weston, Campbell, Crook and Converse, are generally rural with few cities or towns. The following Section describes the various land uses found through the project counties in Wyoming.

4.2.4.1 Agriculture

The agriculture industry in Wyoming is an important part of the economy and represents a significant use of land. Within the project area, raising livestock is a major use of agricultural land. Based on information from the 1998 Wyoming Agricultural Statistics, livestock raised in Wyoming includes cattle for dairy producers and beef, sheep for wool and meat, hogs, and poultry for eggs and meat. Crop production does not represent a major use of land in the project area; however, barley, oats, and hay are produced to varying extents in all counties within the project area. Census information categorizes all land used for agricultural purposes. However, because livestock and grazing are the primary cultural land use, farms in the area are more commonly referred to as ranches.

According to the 1992 Census of Agriculture, of the affected counties, Campbell has the most farms with 476, followed by Converse County with 305, Niobrara County had 278 farms and Weston County had 231 farms (Table 4.2-5).

Table 4.2-5
Farm Statistics-Wyoming

Area	Number of Farms (1992)	Land in Farms (1992) (1,000 Acres)
State of Wyoming	8,716	32,876.1
Niobrara County	278	1,344.6
Weston County	231	1,484.6
Campbell County	476	2,704.4
Crook County	442	1,542.3
Converse County	305	2,363.2

Between 1982 and 1987 the acres of farmland increased in Wyoming. However, from 1987 to 1996, the acres of farmland in Wyoming have decreased slightly from 34,800 acres to 34,600 acres. The number of farms increased in the State and all counties between 1982 and 1987. However, from 1987 to 1997, the number of farms in all of the project counties decreased. In the State of Wyoming, during this time period, there was also a slight decrease in the size of farms.

4.2.4.2 Residential

The project area in Wyoming is primarily rural and sparsely populated. There are several small communities near the project area (the names and populations are listed in Section 4.2.14.1 Population and Demographics. Outside these communities, residences and ranches are scattered throughout the rural areas. These rural residences commonly include a house, along with several other structures such as barns or sheds. The residences tend to be separated from one another by open space.

4.2.4.3 Business and Industrial

Many of the local businesses in the area center on manufacturing and coal production. The industries in the project area of Wyoming include: Wyoming Refining, Pope & Talbot Sawmill and Weston County Hospital and Nursing Home in Newcastle and the Wyodak Mine, Peabody/Powder River Coal Company and Tri-State Insulating company in Gillette. Coal mines in the PRB are major employers in the region. Eleven of these mines, including Belle Ayr, Caballo, Cordero Rojo, Cordero, Coal Creek, Jacobs Ranch, Black Thunder, Antelope, North Antelope / Rochell Complex, and Antelope are located south of Gillette and would be accessed by this proposed project.

4.2.4.4 Minerals and Mining

The mineral and energy reserves found in this region are among the most productive in the United States (USGS 1996). The Powder River Basin contains large reserves of oil, natural gas and coal (De Bruin 1996). Additionally, zeolite (highly absorbent mineral), bentonite (volcanic ash), gypsum (chalk-like mineral), sandstone, limestone, calcareous shale and uranium are mined in the region (Harris 1996; Hausel et al 1979).

<u>Coal</u>

Wyoming produced almost 210 million tons of coal in 1993 which ranks Wyoming first in the United States in production. Coal from the Powder River Basin occurs in deep veins with comparatively little overburden, or soil, covering the coal. This makes the coal easy and economical to mine, which is done in open pits using draglines, trucks and conveyors. Of the affected counties in the project area, Campbell County produces the most coal. Its 16 active mines produce approximately 85 percent of the coal produced in Wyoming and approximately 18 percent of the total national production. The Powder River Basin in Campbell County is a region of extensive exploration and development of energy resources. The coal from this region tends to have low quantities of sulfur and ash which makes it one of the cleanest coals mined in the United

States (USGS 1996). The economical mining of PRB coal and its clean burning characteristics make this coal highly desirable as a fuel source.

Oil and Gas

Oil and gas have been produced in the project area since the early 1900's. Production and exploration continue today. Numerous oil and gas fields occupy the region (De Bruin 1996). Some of the larger fields are Highland Flats Oil Field which is east of Highland Flats along Walker Creek, between the towns of Bill and Dull Center.

Almost 89 million barrels of crude oil were produced in Wyoming in 1993, ranking it fourth in the country. This oil is used as motor fuel and in the manufacture of medicines, plastics and other products from paints to synthetic rubber.

Wyoming's natural gas production in 1993 amounted to 1,054,699,787 thousand cubic feet, ranking it sixth in the nation in natural gas production. Industrial, commercial and domestic heating are the major markets for this gas. The PRB region is currently experiencing a rapidly expanding coal bed methane industry with hundreds of new wells being constructed each year to utilize this resource.

Bentonite

Wyoming leads the nation in production of bentonite. It produced 2.5 million tons in 1993. Bentonite is primarily used by the oil drilling industry, but it is also used in cosmetics, foods, cement manufacturing, toothpaste, wine clarification, as an animal feed binder, and for water softeners. There are bentonite deposits throughout the PRB.

4.2.4.5 Public Facilities

Many communities in the project area are small. Some communities have elementary, middle and senior high schools. Many of the communities have clinics and/or doctor and dentist offices. However, most of the communities do not have hospitals. Hospitals are found in the major towns such as Gillette and Newcastle. Most of the communities have churches and offer recreational facilities such as city parks. Some of the smaller communities have volunteer fire departments and rely on county sheriffs for public protection services.

4.2.4.6 Federal Lands

4.2.4.6.1 Forest Service Lands

The Thunder Basin National Grassland (TBNG) is located in northeastern Wyoming and is one of the 20 National Grasslands that make up the Northern Great Plains. It occupies approximately 572,000 acres of land forming a mosaic land pattern of Federal, state and private land ownership, together totaling over 1.8 million acres. These lands generally lie between an area bordered by Douglas on the south, Newcastle on the east, Gillette on the north and Wright on the west. The TBNG is administered by the U.S. Forest Service (USFS), Medicine Bow-Routt National Forest, Douglas Ranger District, Wyoming. TBNG are present in all the project area counties.

TBNG appears quiet and empty, dominated by sky and wind, stretching from horizon to horizon. However, it contains a diversity of landforms, vegetation and wildlife. The TBNG is a blend of mixed-grass prairie, sagebrush grassland, cottonwood and ponderosa pine/juniper vegetation, with a variety of wildlife including pronghorn, elk, deer and prairie dogs. It is managed for a variety of resources and uses such as livestock grazing, wildlife habitat, minerals production, and recreation.

TBNG was originally called the Northeastern Wyoming Land Utilization Project. The land was later managed by the U.S. Soil Conservation Service (now the U.S. Natural Resources Conservation Service) from 1938-1953. In 1954, the lands were transferred to the U.S. Department of Agriculture and the USFS for management. In 1960, the Land Utilization Project was renamed the National Grasslands and divided into units, one of which became the TBNG (Schmitzer 1999)

In addition to the TBNG, the USFS manages the Black Hills National Forest. Black Hills National Forest is located on the very eastern edge of the project area in Crook and Weston counties, on the South Dakota border.

The USFS is required to inventory, evaluate and consider all roadless areas for possible inclusion in the National Wilderness System. In June of 1977, the USFS initiated a comprehensive process to evaluate areas to be designated roadless and undeveloped. The process by which these lands were evaluated is known as the Roadless Area Review and Evaluation, or RARE II. A RARE II area is one that has met the following criteria:

- the area must be larger than 5,000 acres or, if smaller, contiguous to a designated wilderness or primitive area;

- the area could not contain improved roads maintained for travel by standard passenger-type vehicles;
- the area must be inventoried by the USFS for possible inclusion in the National Wilderness Preservation System.

Some of the areas that were originally designated as Roadless, were included in RARE II. However, no lands were identified on the TBNG in Wyoming under the RARE II process.

As a result of recent revisions to the USFS grassland management plan, a new roadless designation has been created. Under this process, areas are designated as Inventoried Roadless areas. The criteria for this designation, while similar to RARE II, has been modified to allow more lands to meet the standards for inclusion in the National Wilderness Preservation System. There are 3 Inventoried Roadless Areas of the TBNG. Two of these areas, the 5,060 acre HA Divide Inventoried Roadless Area, and the 6,840 acre Red Hills Inventoried Roadless Area are within 2 miles of the project area. The third, the 10,450 acre Cow Creek Buttes Inventoried Roadless Area is approximately 16.0 miles from the project area.

4.2.4.6.2 Bureau of Land Management Lands

Lands managed by the Bureau of Land Management (BLM) occur throughout the project area. These lands were established to manage public lands for public need and environmental conservation. These lands were established as discussed in Section 4.1.4.6.3. Public lands provide many opportunities for commercial activities from mining of coal, natural gas and oil as well as fertilizer minerals, gold, silver and other metals; timber production; livestock grazing; and rights-of-way for other permits and leases. In Wyoming, the BLM is a major manager of public lands and is responsible for mineral leases, including those for the extraction of coal. Additionally, BLM lands also represent a large part of the Nation's natural and cultural heritage. The BLM is usually required to inventory, evaluate and protect such features as rare geologic formations; rare and vulnerable plant and animal communities; wild free-roaming horse and burro herds; wilderness areas and Wild and Scenic Rivers; and paleontological, archaeological and historical sites. BLM lands also offer many recreational opportunities. The BLM administers many fishable streams, lakes and reservoirs, floatable rivers, boating access points, National Back Country Byways, Watchable Wildlife sites and multiple use trails. (BLM, Communications Directorate).

4.2.4.6.3 Bureau of Reclamation Lands

No Bureau of Reclamation Lands occur in the project area of Wyoming.

4.2.4.6.4 Fish and Wildlife Service Lands

No Fish and Wildlife Service Lands occur in the project area of Wyoming.

4.2.4.7 Reservation and Treaty Lands

No reservation lands occur in the project area of Wyoming. However, Indian trust assets associated with the 1868 Fort Laramie Treaty are included in the project domain.

4.2.4.8 State Lands

There are state lands dispersed throughout the project area. Much of this land is leased to local ranchers for grazing.

The nearest state park is Keyhole State Park which is northeast of Moorcroft in Crook County. Fort Fetterman in Douglas, is the closest State Historic Site, located slightly more than 45 miles south of the project area.

4.2.4.9 Utility Corridors

Public utility power lines, telephone cables, oil, gas and water pipelines and roads exist throughout the area. Many private pipeline facilities, including water pipelines to provide livestock watering and oil and natural gas well collector pipelines crisscross the project area.

4.2.5 WATER RESOURCES

4.2.5.1 Surface Water

Surface waters in the project area include rivers, streams, lakes and ponds. The major rivers in the project area include the Cheyenne, the North Platte and the Belle Fourche Rivers. The Belle Fourche drains the area north and west of the Black Hills and flows northeastward into South Dakota. The Cheyenne River drains the area south of the Black Hills and flows eastward into South Dakota. The North Platte and its tributaries drain most of the southeastern quarter of Wyoming. There are many other minor, intermittent and perennial streams and creeks both named and unnamed in the project area which flow only as a direct result of runoff from snowmelt and rainfall.

Rivers and tributaries in northeastern Wyoming provide limited sources of water for domestic, commercial, agriculture and industrial uses. The majority of this water has long been appropriated for agriculture use and irrigation.

Lakes and reservoirs in the project area include: Hansen Lakes, Rochelle Lake, Hay Lake, Bill Smith Reservoir, Little Thunder Reservoir, MW Lake, Robb Reservoir, Porcupine Reservoir and Reno Reservoir. In addition, small ponds and intermittent lakes occur throughout the project area. They are usually found in pasture land and serve to provide watering areas for livestock.

4.2.5.2 Floodplains

Larger rivers within the project area contain floodplain areas. Rivers with some kind of floodplain development include the Cheyenne River, Belle Fourche River and North Platte River. The Cheyenne River is partially impounded by the Angustora Dam in South Dakota. However, neither it or the other rivers are impounded within the project area of Wyoming. All these rivers experience dramatic seasonal fluctuations in water levels due to heavy rains or rapid snow melt, often resulting in flooding throughout the drainages.

4.2.5.3 Wetlands

Wetlands found within the project area are important regional ecosystems. These natural communities provide filtration of sediments and pollutants from surface water runoff, flood water retention, erosion control, resting, foraging, and nesting habitat for waterfowl and mammals, fish spawning and nursery, and amphibian habitat.

Wetlands are defined, for regulatory purposes, in the Clean Water Act. This definition is used by the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) to administer the permit program outlined in Section 404 of the Act. Wetlands under COE juridicition are defined as follows:

> "Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Wetlands generally include swamps, bogs and similar areas (40 CFR 230.3 and 33 CFR 328.3)."

In order to be classified a wetland, a site must possess three characteristics, hydric soils, a dominance of hydrophytic vegetation, and wetland hydrology.

Wetlands found in the project area may be classified in three categories based on the dominant vegetation occurring at the site. Forested wetlands are characterized by woody vegetation that is greater than 6.0 meters tall (Cowardin et al. 1979). The dominant trees found in forested wetlands within the project area are cottonwood (*Populus* spp.) and willow (*Salix* spp.). These wetlands occur along major streams and rivers within the project area. In addition, these wetlands are often only seasonally flooded during the spring and during heavy run-off periods. These wetlands are the least common of the three wetland categories found in the project area of Wyoming. These wetlands provide valuable wildlife habitat as well as other wetland functions.

Scrub/shrub wetlands are characterized by woody vegetation less than 6.0 meters in height. These wetlands consist of a mixture of shrubs and small trees. Common species found in scrub/shrub wetlands include willow (*Salix* spp.), silver sagebrush (*Artiemisia cana*), and plains cottonwood (*Populus deltoides*). Within the project area these wetlands are found along rivers and perennial streams. Only slightly more common than forested wetlands, shrub/scrub wetlands are also uncommon in the project area and provide important wildlife habitat.

Emergent wetlands found within the project area include wet meadows and aquatic bed wetlands. The wet meadows contain a mixture of bulrushes (*Scirpus* spp.), Baltic rush (*Juncus balticus*), prairie cord grass (*Spartina pectinata*), switch grass (*Panicum virgatum),* and Nebraska sedge (*Carex nelrascensis*). The aquatic bed wetland includes plant species such as cattails (*Typha latifolia* and *Typha angustifolia*), and sedges (*Carex* spp.). Aquatic bed wetlands in the project area are typically associated with stock ponds and river oxbows.

4.2.5.4 Groundwater and Wells

4.2.5.4.1 Groundwater

Lower Cretaceous aquifers

The Lower Cretaceous aquifer, located beneath the upper Cretaceous aquifers, are the most widespread aquifers in the Northern Great Plains aquifer system, but contain little freshwater. They are exposed at the land surface mostly as wide or narrow bands that completely or partly encircle basins or uplifted areas. The lower Cretaceous aquifers commonly contain highly mineralized water where they are deeply buried.

Porosity and permeability are variable in the lower Cretaceous aquifers. Yields of most wells completed in these aquifers range from 5 to 60 gallons per minute, although some wells may yield 500 to 1,000 gallons per minute. Many wells completed in the Lower Cretaceous are drilled to considerable depths. Some wells completed in the aquifers are 5,000 feet deep or more.

Paleozoic aquifers

The Paleozoic aquifers are the deepest aquifers in the project area in Wyoming. They are exposed at the land surface only at small areas. These aquifers consist mostly of limestone and dolomite, but some Paleozoic sandstones also yield water. Confining units that overlie and separate the aquifers consist of shale and siltstone with some beds of anhydrite and halite (rock salt). Except near the mountains, the aquifers in lower Paleozoic rocks are deeply buried and, therefore, are not a major source of water.

The Paleozoic aquifers receive recharge (when water enters the aquifer) where they are exposed at the land surface on the flanks or crests of anticlines or by downward leakage from shallower aquifers in places where the shallower aquifers have higher hydraulic heads. Recharge areas of the Paleozoic aquifers generally are at high altitudes and, in the subsurface, the aquifers are overlain by confining units in most places.

Where they are buried to great depths, the Madison Limestone and older, permeable Paleozoic rocks contain oil, gas and brine in places. Fresh groundwater that moves around the margins of bodies of brine can become highly mineralized as it mixes with the dense brine.

4.2.5.4.2 Wells

Lower Tertiary aquifers

The Lower Tertiary aquifers are the uppermost aquifers and are composed of sandstones interbedded with shale, mudstone, siltstone, lignite and coal. Some of the coal beds produce water, especially if the coal has been fractured. Most of the water in the lower Tertiary aquifers is in pore spaces between individual grains that compose the sandstone aquifer, but some of the aquifers contain fractures, bedding planes and joints that provide large-scale openings which store and transmit most of the water.

Permeability of the lower Tertiary aquifers varies. Yields of most wells completed in the lower Tertiary aquifers range from 1 to 50 gallons per minute in Wyoming. Maximum yields exceed 1,000 gallons per minute in Wyoming. These aquifers are deeply buried or overlain by fine-grained rocks in many places. Wells completed in the aquifers commonly are 300 to 900 feet deep and locally are 1,000 to 3,000 feet deep.

Upper Cretaceous aquifers

The Upper Cretaceous aquifers are located beneath the lower Tertiary aquifers. Upper Cretaceous aquifers mostly are deeply buried but are exposed locally at the land surface as a narrow to wide band that borders the lower Tertiary aquifers. The upper Cretaceous aquifers consist of consolidated sandstone and are underlain by a thick sequence of shale that forms a confining unit which separates them from aquifers in older rocks. Most of the water in the sandstone aquifers is in pore spaces between individual grains of sand, but some of the aquifers contain fractures, bedding planes and joints that provide large-scale openings which store and transmit most of the water.

Locally, where the shale is fractured or deeply weathered, it may yield sufficient water for domestic supplies. The aquifers are down warped and faulted to depths of several thousand feet in these basins but contain mostly saline water in their deeper parts. The principal water-yielding formations are the Hell Creek Formation and the Fox Hills Sandstone.

4.2.6 AIR QUALITY

Existing sources of emissions in the project area include railroad locomotives, automobiles, trucks and farm equipment. Vehicle traffic in the project area is responsible for tailpipe emissions including nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2). The primary pollutant produced by locomotives and farm equipment is NO_x. Farming and ranching activities and vehicles using unpaved roadways are sources of fugitive dust. There are also emissions created from manufacturing, construction and mining operations, including coal mining and coal bed methane development.

The Clean Air Act, which was last amended in 1990 (CAAA), requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA, Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six principal pollutants, which are called "criteria pollutants." They include: sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), lead (Pb) and particulate matter (PM). The State of Wyoming has developed its own standards (Wyoming Ambient Air Quality Standards - WAAQS) for these pollutants. Wyoming's standards are at least as stringent as the EPA standards. Air quality for the Wyoming project area is within admissible levels for both standards. The Environmental Impact Statement for the Newcastle Resource Management Plan (Bureau of Land Management) indicates that the air quality in east central Wyoming is generally excellent.

4.2.7 NOISE

The project area in Wyoming is primarily rural. Rail, automobile, truck traffic, and wind are the primary noise sources in the project area. Highways and rail lines throughout the project area contribute to ambient noise levels. Another noise source in Campbell County includes noise generated by blasting, truck and rail traffic, and other activities associated with coal production.

The proposed project area includes several communities. Many of these communities are currently or would potentially as a result of the project, be exposed to various types and levels of rail noise. Wayside noise includes the noise generated by a passing train. Locomotive engine noise, rail noise and car noise contribute to wayside noise. Additionally, trains are required to sound a warning horn when approaching a public grade crossing. Horn soundings are required from approximately 0.25 mile, depending on train speed, prior to a highway/rail grade crossing until the locomotive passes through the crossing. Horn noise is significantly louder than wayside noise and is designed to provide adequate warning to motorists and pedestrians of an approaching train. Noise receptors along a rail line may be exposed to one or both types of noise. Because horn noise is significantly louder than wayside noise, it extends further from the rail line and affects a greater number of noise receptors. The Surface Transportation Board (Board) considers residences, schools, libraries, hospitals, retirement homes, and nursing homes as sensitive to noise.

The following provides a brief profile for the communities in Wyoming within the proposed project area. Included in the profiles are communities which, although they appear on USGS topographical maps and are used as landmarks, likely have no human population and therefore no noise receptors. Table 4.2-6 provides the number of noise sensitive receptors along the existing Burlington Northern Santa Fe (BNFS) rail line or Alternative D currently experiencing average daily noise levels of 65 decibels or more (Ldn 65 contour). A summary of the community profile information is provided in Table 4.2-7.

Weston County

The BNSF rail line trends southeast to northwest through Clifton. Population counts were not available, but are likely below 100. There are no public grade crossings in the community. Noise sensitive receptors in the 65 dBA L_{dn} contour number one.

The BNSF rail line trends south to north through Owens. Population counts were not available, but are likely below 100. There are no public grade crossings in the community. One noise sensitive receptors is within the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest then west through Newcastle. The 1990 population of Newcastle was 3,240. There are 8 public grade crossings in the community. There are 83 noise sensitive receptors in the 65 dBA L_{dn} contour.

The BNSF rail line trends south to north on the east side of Osage. The 1990 population of Osage was 350. There are 2 public grade crossings in the community. There are 14 noise sensitive receptors in the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest through Clay Spur. Population counts were not available, but are likely below 100. There is one public grade crossings in the community. One noise sensitive receptors is within the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest through the south part of Upton. The 1990 population was 985. There are 2 public grade crossings in this community. There are 11 noise sensitive receptors in the 65 dBA L_{dn} contour.

The BNSF rail line trends southeast to northwest through Bentley. Population counts were not available for Bentley, but are likely below 100. There is one public grade crossings in the community. There are no noise sensitive receptors in the 65 dBA L_{dn} contour.

The town of Morrisey occurs in rural Weston County. No population information is available for Morrisey, but it is believed to be zero. No rail lines currently pass through this town

In addition, the towns of Dakoning, Spencer, Jerome, Colloid, and Thorton occur in rural Weston County. However they have no grade crossings and no noise receptors.

Crook County

The existing BNSF rail line trends southeast to northwest through the southern part of Moorcroft. The 1990 population of Moorcroft was 768. There are 2 public grade crossings in the community. There are 5 noise sensitive receptors in the 65 dBA L_{dn} contour.

Campbell County

The existing BNSF rail line trends east to west north of Rozet. Population counts were not available, but are likely below 100. There is one public grade crossings in the community. There are 7 noise sensitive receptors in the 65 dBA L_{dn} contour.

Table 4.2-6
Noise Sensitive Receptors Exceeding 65 dBA L_{dn}
Along Existing BNSF Rail Line - Wyoming

Community	Number of Existing Noise sensitive Receptors			
	Wayside	Wayside/horn	Horn	Total
Dakoming	0	0	0	0
Clifton	0	0	1	1
Owens	1	0	0	1
Spencer	0	0	0	0
Newcastle	0	0	83	83
Osage	0	0	14	14
Clay Spur	0	0	1	1
Jerome	0	0	0	0
Upton	0	0	11	11
Colloid	0	0	0	0
Bentley	0	0	0	0
Thornton	0	0	0	0
Moorcroft	0	0	5	5
Rozet	0	0	7	7

Table 4.2-7
Summary Information for Wyoming Communities Along the Extension Alternatives

County	Community	Rail Line Location	Community Population[1]	Public Grade Crossings	ADT	Noise sensitive Receptors [1]
Weston	Morrisey	east to west south of the town	Not available	Morrisey Road	25	0
	Dakoming	south to north through the town	Not available	None	--	0
	Clifton	southeast to northwest through the town	Not available	None	--	1
	Owens	south to north on the east side of town	Not available	None	--	1
	Spencer	south to north through the east side of town	Not available	None	--	0
	Newcastle	southeast to northwest then west through the city	3,240	US 85 Faye Ave US 16 By-pass W Main Street Walker Ave Williams Ave Grove	100 221 100 4700 652 100 1189	83
	Osage	south to north on the east side of town	Not available	E Railroad St Skull Creek Road	252 480	14

Table 4.2-7
Summary Information for Wyoming Communities Along the Extension Alternatives

County	Community	Rail Line Location	Community Population[1]	Public Grade Crossings	ADT	Noise sensitive Receptors [1]
Weston *(Continued)*	Clay Spur	southeast to northwest through town	Not available	Baroid Road	100	0
	Jerome	south to northwest north of the town	Not available	None	--	0
	Upton	southeast to northwest through the south part of town	985	Highway 116 Pine Street	790 35	11
	Colloid	southeast to northwest on the north side of town	Not available	None	--	0
	Bentley	southeast to northwest through the town	Not available	Thorn Road	100	0
	Thornton	southeast to northwest south of the town	Not available	None	--	0
Crook	Moorcroft	southeast to northwest through the southern part of town	768	Warbonnet Road S. Big Horn Ave	20 33	5
Campbell	Rozet	east to west north of Rozet	Not available	Bishop Road	100	7

[1]1990 Census Data

4.2.8 BIOLOGICAL RESOURCES

4.2.8.1 Vegetation

Vegetation in the project area includes several generalized ecosystems, including short- and mixed- grass prairies, riparian areas, and wetlands. These different plant communities are influenced by several factors such as rainfall, evaporation, and soil characteristics.

Most of the project area consists of grasslands. Some of these grasslands in the Great Plains have been plowed for winter wheat production, but large tracts of grass and shrub-dominated vegetation remain. Wherever grasslands occur, specific plant species composition changes in response to topographic gradients such as from hilltops to valley bottoms. Valley bottoms are generally more fertile and mesic than hilltops.

Shortgrass prairie is dominated by blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloë dactyloides*). Prickly pear (*Opuntia* spp.), yucca (*Yucca glauca*) and scarlet globemallow (S*phaeralcea coccinea*) are common forbs found in this plant community.

Mixed-grass prairies can be divided into several types, but are all characterized by needle-and-thread grass (*Stipa comata*), western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis)*, threadleaf sedge (*Carex* spp.), Indian ricegrass (*Oryzopsis hymenoides*), pricklypear cactus, scarlet globemallow, fringed sagewort (*Artemisia campestris)* and various species of milkvetch (*Astragulus* spp.) and locoweed (*Oxytropis* spp.). There may be fifty or more plant species per hectare present within a mixed grass prairie. Mixed-grass prairies in the foothills are typically dominated by bluebunch wheatgrass (*Agropyron spicatum)*, little bluestem (*Andropogon scoparius)* and sideoats grama (*Bouteloua curtipendula).* On sandy soils, Indian ricegrass, prairie sandreed *(Calamovovilfa longifolia)*, sand dropseed *(Sporobolus cryptandrus)*, sand sagebrush *(Artemisia filifolia)*, and yucca may be common. Saline soils lead to an increased abundance of such halophytes as alkali sacaton *(Sporobolus airoides)*, four-wing saltbush *(Atriplex canescens)*, greasewood (*Sarcobatus vermiculatus),* and inland saltgrass (*Distichlis spicata).*

The big sagebrush (*Artemisia tridentata*) Shrub land plant community occurs throughout the project area. Species common to the community on eroded or disturbed sites include silver sagebrush and rabbitbrush (*Chrysothamnus nauseosa*). Greasewood is common in depressions and floodplains. Understory species present include western wheatgrass, blue grama, prairie June grass (*Koeleria macrantha*), needle-and-thread grass, pricklypear cactus and scarlet globe mallow.

The coniferous forest community is dominated by Rocky Mountain juniper (*Juniperus scopulorum*), with ponderosa pine (*Pinus ponderosa*) as an overstory species. Common shrub species found include current (*Ribes cereum*), sumac (*Rhus* spp.) and yucca. Grasses occurring in the forest include needle grass, blue grama, and sideoats grama.

The riparian plant community is found along rivers, streams, wetlands, and lakes within the project area. This plant community is often a transition zone between wetlands and uplands. Riparian areas are often wetter and more nutrient rich than the adjacent uplands. These conditions result in rich soils and lush vegetation growth. Common plant species found include plains cottonwood (*Populus deltoides*), willow (*Salix* spp.), green ash (*Fraxinus pennsylvanica*), chokecherry (*Prunus virginiana* var. *interius*), buffaloberry (*Shepherdia* spp), and skunkbush (*Rhus aromatica* var. *trilobat*a). This community provides important wildlife habitat and is heavily utilized by livestock.

A portion of the project area in Wyoming is used for cropland. Wyoming has the second largest average sized farms and ranches in the nation. Typical crops grown in the project area include spring wheat, winter wheat, hay, sunflowers and oats. Land that is not used for crop production is often managed as pasture or rangeland for grazing by sheep, cattle, horses and wildlife. Most pasture forage is native, especially blue grama grass, western wheatgrass, big sagebrush, needle grasses, and June grass.

Livestock grazing is widespread within the project area. The USFS and BLM manage grazing allotments on their properties along the proposed alternatives. TBNG, Douglas Ranger District, manages the Forest Service allotments. BLM allotments are managed by the Newcastle or Buffalo Field Offices.

Cattle are the principal livestock grazed on the allotments. However, sheep, horses, and bison graze on several of the public land allotments. The carrying capacity of the allotments varies from about 1.7 to 11.9 acres/animal use (AUM), with the average of all the allotments being about 4.5 acres per AUM. An AUM is defined as the amount of forage needed to sustain a 1,000 pound animal for 1 month and is equivalent to about 800 pounds of air-dry foliage. The carrying capacity of the allotments varies with soil type, vegetation type (forage production), slope and water availability. The grazing season may begin as early as March and extend to December on some allotments. However, for most allotments the total grazing period on public and private lands is April to November.

Allotments are monitored periodically to determine range condition, production and trend. In the proposed project area, the public lands are typically scattered 40- to 80-acre parcels that are surrounded by private lands and generally not accessible to the public. Most of the ranchers using these parcels generally have a low percentage of public land in their total operations.

Rangeland is the dominant land-use category within the project area. Rangeland is dominated by naturally occurring grasses, and forbs. Common species occurring in rangeland include bluestems, grama grasses, wheatgrasses, needlegrasses and fescues.

Shrub and brush dominated rangeland occurs in more arid and semi-arid areas. They are characterized by woody stem vegetation. Some of the common species occurring in this rangeland include big sagebrush, shadscale (*Atriplex confertifolia)*, saltbush and greasewood. Part of the project area also crosses mixed rangeland which is classified as being one-third of either shrub/brush or herbaceous plant species. Both of these range types are important for grazing and wildlife habitat within the project area.

Sensitive Species

Table 4.2-8 lists known rare plant species for the study counties in Wyoming.

Table 4.2-8
Known Rare Plants - Wyoming

Common Name	Wyoming Status	Date Observed
Niobrara County		
robust toothcup	S1	1984
long-stalked racemose milkvetch	S1	1979
Weston County		
Barr's milkvetch	S3	1978
Barr's milkvetch	S3	1991
Barr's milkvetch	S3	1993
Campbell County		
Barr's milkvetch	S3	1978
Barr's milkvetch	S3	1985
Barr's milkvetch	S3	1991

Table 4.2-8 Known Rare Plants - Wyoming		
Common Name	**Wyoming Status**	**Date Observed**
Converse County		
merlin	S2B, SZN	1991
rosy palafoxia	S1	1979

S1 - extremely rare
S3 - rare
S2B - very rare
SZN - species which are not of significant status when migrating through or wintering in Wyoming
(Wyoming Natural Diversity Database 1998)

4.2.8.2 Wildlife

In the project area wildlife is an important resource that provides recreational, aesthetic, and economic benefits.

4.2.8.2.1 Big Game

Big game located in the project area include pronghorn (*Antilocapra americana*), mountain lion (*Felis concolor*), mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*) and white-tailed deer (*Odocoileus virginianus*).

Pronghorn

Pronghorn are found yearlong in the project area. Their general habitat is open, rolling sagebrush/grasslands. Pronghorn-range throughout the project area is considered to be winter/year-long, meaning a portion of the area is used by pronghorn at all times of the year. However, during winter there is a significant influx of animals to this area from other seasonal ranges. Also, a large portion of the Antelope Creek area in northern Converse County serves as severe winter range for the pronghorn. This winter range is used occasionally during extremely severe winters.

Mule Deer

Mule deer are found throughout the project area. The Thunder Basin Mule Deer Herd Unit is located within the project area. This population includes deer in the southeast portion of

Campbell County, northern Niobrara County, and Weston County. The project area also includes the Black Hills Mule Deer Herd Unit. Winter/year-long and year-long seasonal ranges for mule deer occur in the project counties.

White-tailed Deer

White-tailed deer inhabit coniferous forests, cottonwood riparian corridors, and agricultural croplands within the project area. The Thunder Basin White-Tailed Deer Herd Unit, which encompasses Campbell, Weston, Niobrara, and eastern Converse counties and the Black Hills White-Tailed Deer Herd Unit are within the project area. These herd units include both yearlong and winter white-tailed deer seasonal ranges.

Elk

Elk inhabit the Rochelle Hills area which includes southeast Campbell, southwest Weston, and north central Converse counties. This area is characterized by ponderosa pine woodlands and savannah, along with mixed sagebrush and short-grass prairie. The New Rochelle Hills Herd Unit occurs in areas classified as year-long and winter/year-long seasonal range. The project area also contains elk parturition areas where cows congregate to give birth. In addition, portions of the Black Hills Herd Unit can be found within the project area.

Mountain lions

Mountain lions, also known as pumas, cougars, panthers and catamounts, live mostly in the mountains and foothills near the proposed project area. Relatively intolerant of human activity, they seek remote areas with large populations of deer, their preferred food source. Mountain lion are hunted in Wyoming, in very limited numbers, and the project area would cross Mountain Lion Hunt Area 21 in the northeast corner of the State.

4.2.8.2.2 Game Species

Upland Game Birds

Game birds in the project area include sage grouse (*Centrocercus urophasianus*), sharp-tailed grouse (*Tympanuchus phasianellus*), gray or Hungarian partridge (*Perdix perdix*), wild turkey (*Melegris gallopavo*) and mourning dove (*Zenaida macroura*). The sage grouse is the most common game bird within the project area. However, sage grouse numbers in the project area have declined over the past 20 years (Heath *et al.*, 1997). Sage grouse live and feed in areas of sage brush habitat close to water and are generally near a lek or breeding ground. There are several sage grouse leks within the project area. The habitat of the sharp-tailed grouse is primarily grassland interspersed with shrub- and brush-filled draws. The Hungarian (gray) partridge was introduced into Wyoming in 1938. It lives in a mixture of cultivated and non-cultivated land; grasslands interspersed with wheat fields, weed patches and brushy cover. The wild turkey is located in the eastern and northern parts of the study area. It was introduced into Wyoming beginning in 1935. The wild turkey's habitat includes open ponderosa pine forests in rugged terrain interspersed with grassland and brushy draws.

Waterfowl

Although the project area of Wyoming is dry compared to areas of Minnesota and eastern South Dakota, it is still utilized by a wide variety of waterfowl. During the summer months, a diversity of waterfowl nest throughout the area, utilizing what water is available in stock ponds, irrigation ponds, and streams. Nesting occurs in association with these wetlands and in adjacent uplands, including rangeland and sagebrush areas. While a large variety of ducks use the area, the available habitat limits their numbers. During the spring and fall, the number and variety of waterfowl in the area increases as birds migrating south from more northerly breeding grounds in Montana and Canada move through the area. Species utilizing the area include mallard, pintail, gadwall, green-winged teal, blue-winged teal, shoveler, wigeon, redhead, canvasback, ringneck, wood duck, and Canada goose.

Small Game and Furbearers

Small game and furbearers in the project area in Wyoming include desert cottontail rabbit (*Sylvilagus audoboni*) and whitetail jackrabbit (*Lepus townsendi*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), yellow-bellied marmot (*Marmota flavinentris*), porcupine (*Erethizon dorsatum*), raccoon (*Procyon lotor*) and badger (*Taxidea taxus*). There are also many blacktail prairie dog (*Cynomys ludovicianus*) towns within the project area. These species occur in a diversity of habitats and are found throughout the project area.

4.2.8.2.3 Non-game Species

Amphibians

Amphibians present in the project area include the tiger salamander (*Ambystoma trigrinium*), great plains toad (*Bufo congnatus*), woodhouse's toad (*Bufo woodhousei woodhousei*) and northern leopard frog (*Rana pipiens*). These species are generally restricted to wetland or riparian areas providing water for breeding.

Reptiles

Reptiles present in the project area include the short-horned lizard *(Phrynosoma douglassii*), sagebrush lizard (*Sceloporus graciosus*) prairie rattlesnake (*Crotalus viridis*), bullsnake (*Pituophis melanoleucas sayi*) and plains hognose snake *(Heterodon nasicus*). These species occur in a variety of habitats throughout the project area.

Songbirds

Many of the songbird species found in the proposed project area of Wyoming are similar to the South Dakota species. Common grassland birds include the Eastern kingbird (*Tyrannus tyrannus*), Western kingbird (*Tyrannus verticalis*), Western flycatcher (*Empidonax difficilis*), horned lark (*Eremophila alpestris*), warbling vireo (*Vireo gilvus*), vesper sparrow (*Pooecetes gramineus*), song sparrow (*Melospiza melodia*) and lark bunting (*Calamospiza melanocorys*)

In riparian areas the tree swallow (*Tachycineta bicolor*), bank swallow (*Riparia riparia*), cliff swallow (*Hirundo pyrrhonota*), barn swallow (*Hirundo rustica*), gray jay (*Perisoreus canadensis*), black-billed magpie (*Pica pica*), American crow (*Corvus brachyrhynchos*), black-capped chickadee (*Parus atricapillus*), house wren (*Troglodytes aedon*), American robin (*Turdus migratorius*), loggerhead shrike (*Lanius ludovicianus*) and European starling (*Sturnus vulgaris*) may be found.

Shorebirds

Shorebirds utilize habitats in the project area similar to those of waterfowl. Common shorebirds in the project area include Virginia rail (*Rallus limicola*), sora rail (*Porzana carolina*), American coot (*Fulica americana*), common snipe (*Capella gallinago*), killdeer (*Charadrius vociferus*), mountain plover (*Charadrius montanus*), greater yellowlegs (*T. melanoleuca*), lesser yellowlegs (*T. flavipes*) and spotted sandpiper (*Actitis macularia*).

Small Mammals

Small mammals that may occur in the project area include the dwarf shrew (*Sorex namus*), short-tailed shrew (*Blarina brevicauda*), little brown myotis (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), least chipmunk (*Eutamias minimus*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), northern pocket gopher (*Thomomys talpoides*), olive-backed pocket mouse (*Perognathus fasciatus*), hispid pocket mouse (*Perognathus hispidus*), deer mouse (*Peromyscus maniculatus*) and meadow vole (*Microtus pennsylvanicus*). These species occur in a variety of habitats throughout the project area. Bat species may utilize road and railroad bridges for daytime roosting.

Raptors

Raptors which have been observed in the project area include golden eagle (*Aquila chrysaetus*), bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), Swainsons hawk (*Buteo swainsoni*), Prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), Coopers hawk (*Accipiter cooperi*), Sharp-shinned hawk (*Accipiter stratus*), Northern goshawk (*Accipiter gentilis*), barn owl (*Tyto alba*), and great horned owl (*Bubo virginianus*). These species occur throughout the project area, often ranging over large areas when foraging for food. Many of these species also nest in the project area. All raptor species are Federally protected against shooting, harassment, and capture.

4.2.8.3 Aquatic and Fisheries

There are limited opportunities for fishing in the project area due to most streams being intermittent and other waterbodies limited to small stock ponds. The game fish occurring in the larger lakes include channel catfish (*Ictalurus punctatus*), walleye (*Stizostedion vitrion)*, largemouth bass *(Micropterus salmoides*) and rainbow trout (*Salmo gairdheri*).

The following table shows the common fish species occurring in the major river systems in the project area.

Table 4.2-9
Common Fish Species -Wyoming

Upper Cheyenne River	Common Carp (*Cyprinus carpio*)
	Fathead Minnow (*Pimephales promelas*)
	Sand Shiner (*Notropis stramineus*)
	White Sucker (*Catostomus commersoni*)
	Black Bullhead (*Ameirus melas*)

Table 4.2-9 Common Fish Species -Wyoming	
Belle Fourche River	Carp (*Cyprinus* sp.)
	Fathead Minnow (*Pimephales pramelas*)
	Red Shiner (*Cyprinella lutrensis*)
	Sand Shiner (*Notrophis stramineus*)
	White Sucker (*Catostomus commersoni*)
	Black Bullhead (*Ictalurus melas*)

4.2.8.4 Endangered, Threatened and Special Status Species

The U.S. Fish and Wildlife Service (USFWS) was consulted regarding endangered and threatened species in the proposed project area. The USFWS identified four Federally-listed endangered or threatened wildlife and plant species that could potentially occur in the project area. These are the black-footed ferret (*Mustela nigripes*, endangered), whooping crane (*Grus americana*, endangered), Ute ladies' tresses orchid (*Spriranthes diluvialis*, threatened) and bald eagle (*Haliaeetus leucocephalus*, threatened).

Three other species, mountain plover (*Charadrius montanus)*, swift fox (*Vulpes velox*) and sturgeon chub (*Macrhybopsis gelida*), are candidates for listing as endangered or threatened. In addition to these species the USFWS has been petitioned to list the black-tailed prairie dog (*Cynomys ludovicianus*) under the Endangered Species Act and its status is currently being reviewed.

The Wyoming Natural Diversity database was used to obtain more specific information regarding these species. General descriptions of where these species may occur within the proposed project area are presented below. More detailed descriptions of the species, species habitat and occurrences are presented in the Biological Assessment (Appendix K).

4.2.8.4.1 Black-footed Ferret

Black-footed ferrets are members of the weasel family. The animal lives in arid prairies in proximity to prairie dog colonies. Black-footed ferrets feed primarily on prairie dogs (90 percent) and utilize their burrows for dens. Black-footed ferrets are nocturnal and spend much of their time underground so their presence in an area is difficult to confirm (Whitaker 1980). According to available information compiled by Clark (1978), the USFWS (Jobman and Anderson 1991) and

Wyoming Natural Diversity Database (WNDDB 1998) the following sightings or physical evidence (1988 or earlier) exists for black-footed ferrets within study counties in Wyoming: 16 in Campbell; 14 in Converse; 6 in Niobrara; and 6 in Weston. Black-footed ferrets have been proposed for reintroduction into the Rosecrams area on USFS lands in southwestern Weston County.

4.2.8.4.2 Whooping Crane

Whooping cranes are found only in North America. Whooping cranes currently exist as three wild populations and in 4 captive locations, totaling approximately 260 individuals. Most whooping cranes migrate from Wood Buffalo National Park in Canada to Aransas National Wildlife Refuge on the Texas gulf coast (USFWS 1994b). This migration path could take them across eastern Wyoming. Habitats utilized by migrating whooping cranes in Wyoming include marshes, wet meadows and crop fields near water. (Ashton and Dowd 1991). Whooping cranes have not been recorded from the proposed project area.

4.2.8.4.3 Ute Ladies' Tresses Orchid

Ute ladies' tresses orchid is a perennial, terrestrial orchid occurring in moist soils in wet meadows near springs, lakes or perennial streams (England 1992). Increased disturbances to stream systems and conversion of land to urban uses has resulted in the decline of this orchid species. This species can only be positively identified when in flower. However, it may only flower once every 3 to 5 years. Therefore, potential habitat is generally considered to contain them. Surveys for the orchid were conducted in September 1998 (Biological Assessment - Appendix K). Two sites in Weston County were considered potential habitat (Kass 1998). However, no orchids were found during the survey.

4.2.8.4.4 Bald Eagle

Bald eagles have been documented wintering within the project area. Observations seem to indicate that the TBNG in Wyoming is important to wintering bald eagles. Communal, nocturnal roosts, diurnal perch sites and feeding areas are all key winter habitat components that are located within the proposed project. Specific locations of where bald eagles have been reported in the proposed project area may be found in the Biological Assessment, Appendix K.

4.2.8.4.5 Mountain Plover

Mountain plovers have been associated with prairie dog towns where vegetation has been reduced (Knowles *et al.*, 1982; Olson-Edge and Edge, 1987; Knopf and Miller, 1994). They nest in areas of low herbaceous vegetation, reduced shrub cover and near prominent objects such as cow-manure piles or similar-sized rocks (Graul ,1975; Prellwitz 1993; Knopf and Miller 1994). Results of a study conducted in northeast Wyoming showed that mountain plovers nested at sites with low or absent shrub growth and where grasses and forbs were also short (Parrish *et al.* 1993). In that study, mountain plovers seldom nested on prairie dog colonies but adults with broods were seen on colonies (Parrish *et al.*, 1993).

Surveys for occurrence of mountain plovers on black-tailed prairie dog colonies were conducted on the TBNG in 1997. A total of 26 adults and 20 juvenile plovers were seen within approximately 4,900 acres of prairie dog colonies surveyed (T. Byer Forest Service, TBNG. Unpublished data). Two mountain plovers were seen on one National Biological Survey (NBS) breeding bird survey route (Newcastle) in Wyoming. Mountain plovers have also been documented in annual wildlife monitoring reports on coal mines and in the vicinity of coal mines in Campbell County.

4.2.8.4.6 Swift Fox

The swift fox is a member of the Canidae family and is the smallest of the American foxes. The fox occupies short-, mid- and mixed-grass prairies (Carbyn 1993). The swift fox is unafraid of man, therefore, it has been easily trapped and poisoned by efforts aimed at coyotes and wolves. Other factors affecting the decline of the swift fox include fragmentation or destruction of suitable habitat, interspecies competition, prey reduction by rodent control, hunting and predation. There are records of swift fox in Campbell and Converse counties.

4.2.8.4.7 Sturgeon Chub

Sturgeon chub are members of the minnow family. The fish inhabits shallow, sand or gravel bottom zones in areas with strong currents in warm and highly turbid medium to large rivers (Lee et al. 1980). Alteration of the larger rivers through impoundment, channelization and snag removal, reducing the amount of riffle habitat, appear to be some of the causes for the decline of the sturgeon chub. Sturgeon chub are only known to occur in the Powder River in Campbell County.

4.2.8.4.8 Black-tailed Prairie Dog

Black-tailed prairie dogs are social animals that live in large colonies or towns in short- and mid-grass prairie. Since the turn of the century the black-tailed prairie dog population has declined by 98 percent. Less than 1percent of the original prairie dog habitat remains intact (Johnson 1997). This decline is a result of habitat fragmentation through agriculture and urban development, eradication by ranchers, population reduction through state and Federally supported animal control programs, recreational shooting and wildlife disease (Johnson 1997). Prairie dogs play an important role in their ecosystem. Badgers, coyotes, weasels, golden eagles, hawks, black-footed ferrets and other predators feed upon prairie dog. Additionally, several species such as rabbits, snakes, burrowing owls and black-footed ferrets use vacant burrows. Additionally, mountain plovers, grasshopper sparrows and other ground nesting birds are found in greater numbers in prairie dog towns. Native grasses are also more abundant (NGPC no date-b). The prairie dogs continued survival is imperative to the survival of Federally endangered black-footed ferrets.

Black-tailed prairie dog colonies occur throughout the project area. The current activity status of each prairie dog colony is unknown. Some colonies have become inactive due to sylvatic plague epizootics (disease that affects many animals of one kind at the same time). Others have been poisoned by county weed and pest control agents and/or private land owners. For most of the colonies that have been mapped there is no additional information about the extent or geographic proximity of other colonies that would form a local colony complex.

4.2.9 TRANSPORTATION

Interstate 90 (I-90) is the only interstate highway in the project area. I-90 travels southwest and then westerly through southern Crook, and central Campbell counties remaining north of the proposed Extension Alternatives. In addition, there are several U.S. Highways in the project area including U.S. Highway 85 which runs north and south near the Wyoming/South Dakota border. It has an average daily traffic (ADT) of 100, and U.S. Highway 18 that runs east and west through the project area. It has an ADT of 2,285.

State Highway 59 travels north and south from Gillette to Douglas. State Highway 450 travels east to west through the southern part of Weston, and Campbell counties. It has an ADT of 430. State Highway 116 travels south to north through the central part of Weston County. It has an ADT of 790. Other state highways that are near the project area include State Highway 51 (14/16) with an ADT of 100, State Highway 387, State Highway 50, State Highway 270, and 272, and State Highway 451.

There are numerous county roads in the project area. These roads tend to connect small towns to each other and to state and Federal highways. Many of these roads are gravel surface.

Both USFS and BLM lands contain a network of roads maintained by the managing agency. These roads are generally dirt or gravel and can generally be used by the public. These roads have low levels of traffic. Traffic levels would likely be seasonally affected. All Terrain Vehicle (ATV) use could contribute to much of the traffic in the winter months and automobile traffic would become more prevalent in the summer months. These roads contribute to the extensive network of roads throughout the project area.

The project area contains many private roads. These roads consist of driveways and farm roads as well as oil and gas company roads. Farm roads are primarily used by slow moving farm equipment and personal vehicles. Some of these private roads are rough, dirt roads, while others have improved hard surfaces.

There are two rail lines in the project area: one is the line operated jointly by Burlington Northern Santa Fe Railway Company (BNSF) and Union Pacific Railroad Company (UP) (Joint line) that runs south of Gillette through Campbell and Converse counties. This line provides access for the two railroads to the active coal mines south of Gillette. The other rail line is the BNSF rail line that runs southeast from Gillette into Weston County, continuing through Newcastle and south through South Dakota and into Nebraska. Both of these lines are used mainly to transport coal from the PRB.

The closest airport to the study area is a county airport just north of Gillette near State Highway 59. This airport is a limited facilities air field. There is also another limited facilities air field in the project area located northwest of Newcastle along U.S. Highway 16. Private landing strips are scattered throughout the project area and are mostly grassy strips.

4.2.10 SAFETY

There are currently no DM&E rail/highway grade crossings in the Wyoming project area. However, other railroads (BNSF and UP) do have grade crossings on local roads. Grade crossings are primarily limited to local, county, or private roads with low levels of traffic. Other roads with higher vehicle traffic contain grade separated crossings, reducing the number of grade crossings and vehicles potentially using a grade crossing. Another safety consideration in the project area is fire. Fires were a natural occurrence across the Great Plains historically. However, today they threaten lives, homes, livestock, and land. Lightning is the primary cause of fire in the project area. However, fires have been started from locomotive operations and maintenance activities due to carbon embers from locomotive exhaust, sparks occurring during breaking or welding activities.

4.2.11 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

DM&E currently transports no hazardous materials in the project area counties.

Hazardous Waste Sites

A records review of various Federal and state databases was conducted to identify areas of potential contamination within the project. These sites could be a result of industrial development, mining activities, oil and gas extraction, or accidents. Sites within 1.0 mile of the existing rail line and new construction alternatives were considered to be in the project area. Databases reviewed included:

- Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)
- EPA National Priorities List (NPL)
- EPA Resource Conservation and Recovery Information System (RCRIS) Permitted Treatment, Storage and Disposal Facilities (TSD)
- EPA Emergency Response Notification System - 1999 (ERNS)
- EPA Corrective Action Reports (CORRACTS)
- Wyoming Leaking Underground Storage Tanks (LUST)
- Wyoming State Hazardous Waste Sites (SHWS)
- Wyoming Underground Storage Tanks (UST)
- Wyoming Solid Waste Facilities/Landfill (LF).

The results of the review are discussed below.

Also known as Superfund, the NPL database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the EPA. The database was searched to a 1.0-mile radius of the proposed alternatives. No NPL sites were identified.

CERCLIS contains data on potentially hazardous waste sites that have been reported to the EPA by states, municipalities, private companies and private persons, pursuant to §103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to be or are on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL. As of July 1, 1999, thirty

CERCLIS sites are located in Wyoming. None of these CERCLIS sites are located in the project area.

CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. CERCLIS - NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund Action of NPL Consideration. The database was searched to include the proposed DM&E alternatives through Wyoming and a 1.0-mile band of land on either side of the proposed alternatives. No CERCLIS - NFRAP sites were identified.

The SHWS records are the State of Wyoming's equivalent to CERCLIS. These sites may or may not already be listed on the Federal CERCLIS list. Priority sites planned for cleanup using state funds are identified along with sites where the cleanup will be paid for by potentially responsible parties. The data comes from the Wyoming Department of Environmental Quality. The database was searched for SHWS within 1.0-mile of the proposed alternatives. No SHWS were identified.

RCRIS database includes selected information on facilities that generate, store, treat, or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). This database was searched to a 1.0-mile radius of the proposed alternatives. No RCRA Treatment, Storage and Disposal Facilities (TSDFs) were identified.

The Solid Waste Facilities/Landfill Sites (SWF/LF) records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data comes from the Wyoming Department of Environment and Natural Resources Protection Agency's Licensed Solid Waste Facilities list. The database was searched to a 0.5-mile radius of the proposed alternatives. No SWF/LF sites were identified in the database search.

The LUST incident reports contain an inventory of reported LUST incidents. The data comes from the Wyoming Department of Environmental Quality. The database was searched to a 0.5-mile radius of the proposed DM&E alignments. Table 4.2-10 provides a listing of LUST sites identified by county.

Table 4.2-10 LUST Sites Identified in the Project Area - Wyoming		
COUNTY	**SITE NAME**	**TOWN**
Crook	Crook County Shop	Hulett
Crook	Aladdin General Store	Aladdin
Crook	Keyhole Kounty Store	Moorcroft
Crook	Amoco Service Station 9624	Moorcroft
Crook	Nelson's - 6th & Cleveland	Sundance
Crook	Leslie's Standard Service	Sundance
Niobrara	Lusk Kwik Stop	Lusk
Niobrara	3 Sisters Truck Stop	Manville
Weston	Frank's Service	Newcastle
Weston	Black Hills Plumbing	Newcastle
Weston	Gas & Go	Newcastle
Weston	Newcastle Kwik Stop	Newcastle

The UST database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data comes from the Wyoming Department of Environmental Quality. The database was searched to a 0.5-mile radius of the proposed alternatives. Over 100 underground storage tank (UST) sites are located within 0.5-mile of the proposed alternatives. Twenty-five UST sites are located within a 0.25-mile radius of the proposed alternatives.

ERNS is a national database that stores information on releases of oil and hazardous substances. The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended - Section 103; Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) - Section 304; the Federal Water Pollution Control Act (Clean Water Act) - Section 311; and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) - Sections 300.51 and 300.65 have release notification requirements that are supported by ERNS. No ERNS sites were reported located within 1.0-mile of the proposed alternatives.

CORRACTS is a list of RCRA facilities with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every facility that has had corrective action activity. This database was searched for CORRACTS facilities within 1.0-mile of the proposed alternatives. No CORRACTS sites were identified.

4.2.12 ENERGY RESOURCES

Transportation of Energy Resources

Coal from the Powder River Basin is currently being transported by both BNSF and UP. Over 200 million tons of coal is transported annually by these railroads. Natural gas and petroleum recovered from the area is transported by pipeline out of the area.

Utilization of Energy Resources

Coal from the Powder River Basin is some of the lowest sulphur content coal mined in the United States today. This coal is used by utilities and industries throughout the county to meet air quality regulations aimed at reducing sulfur emissions. Sulfur emissions have been implicated in acid rain formation. The current regulatory environment for electrical utilities and generation of electrical power, discussed in detail in Chapter 1, has resulted in an increasing demand for PRB coal. Additionally, the low cost to mine PRB coal results in the coal being cheaper for the user, increasing its use and demand. The quantity of coal obtained from this region and its distance from the users requires this coal be transported by rail. Transportation by any other means, primarily truck, would be impractical due to the number of trucks required (200 million tons would require over 6.6 million trucks with a capacity of 60,000 pounds).

As discussed in Chapter 1, demand for PRB coal is anticipated to increase. However, problems currently exist at time with sufficient rail capacity being unavailable to meet the demand, thereby limiting the utilization, of PRB coal.

4.2.13 CULTURAL RESOURCES

Humans have occupied the Great Plains of North America and the area of the proposed project from at least 13,000 years ago and possibly before. Occupation in the project area of Wyoming would be similar to that described in Section 4.1.13.

The cultural history of eastern Wyoming presented in this document provides a brief look at the extensive cultural history of the area. The culture history of eastern Wyoming closely parallels that of western South Dakota. Table 4.2-11 summarizes the culture history derived from

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Table 4.2-11
Cultural Chronology - Eastern Wyoming

Period	Dates	Distinguishing Traits
Paleoindian Period	11,200 to 8,500/8,000 RCYBP	Mainly recognized by distinctive projectile point types such as Clovis, Folsom, Goshen, Hell Gap, Meserve, Cody, Agate Basin Scottsbluff, Eden and Dalton.
Archaic Period	8,500 to 1,500 RCYBP	Normally divided into Early, Middle and Late periods.
Early Archaic	8,500 to 7,000 RCYBP	Hawken and Hawken II projectile points. Indication of changes in subsistence strategies with a greater reliance on small game and wild plants to supplement large fauna.
Middle Archaic	7,000 to 2,500 RCYBP	Grinding stones, food preparation pits and round pit houses. McKean, Duncan and Hanna projectile points.
Late Archaic	2,500 to 1,500 RCYBP	A more systematic exploitation of bison than in the Middle Archaic and a tendency to reuse kill sites. Pelican Lake and Yonkee projectile points.

Table 4.2-11
Cultural Chronology - Eastern Wyoming

Period	Dates	Distinguishing Traits
Late Prehistoric	1,500 RCYBP to AD 1,600	Increase in population, highly organized and extensive bison kills, and a reduction in projectile point size. Projectile points tend to be small and side-notched possibly indicating introduction of the bow.
Plains Woodland	500BC to AD 900/950	Pottery, side-notched projectile points. Communal bison hunting, and the use of wide spectrum of food sources. Pottery is developed and small scale horticulture (gardening). Evidence also includes corrals and jumps associated with antelope and bison hunting.
Protohistoric	AD1600 to 1874	Most of what is known comes from the accounts of EuroAmericans who were colonizing the periphery of the Plains. Some information also comes from Native American Tribes narratives and some pictographic records. Tribes are for the first time identified. Protohistoric sites may be identified by the existence of EuroAmerican trade goods of metal, guns, decorative artifacts and the horse.

Table 4.2-11 Cultural Chronology - Eastern Wyoming		
Period	**Dates**	**Distinguishing Traits**
Historic Period	1874 to present	Native American sites may be identified by stone circles along with other continuing Late Prehistoric patterns. Later in the period these sites may be identified by artifacts in association with EuroAmerican style dwellings. Fur trading posts, military camps as well as the remains of trails can be indicators of early commercial exploitation and military presence. Dugouts, foundations, cabins, outbuildings, mining, cellars, fencing, wells, trails, or family graves may be other indicators of historic archaeological sites.

Cultural resources are found throughout the project area. The Area of Potential Effect[1] (APE) for comparison purposes in this draft EIS is an area 1 mile either side of the proposed alternative. The APE for the preferred or selected alternative is discussed in the Identification (ID) plan in Appendix J. SEA conducted a review of the Wyoming State Historic Preservation Offic (SHPO) site files for the areas within the APE for each Extension Alternative alignment. However, because much of the project area has not been surveyed, little information is available concerning the presence of cultural resource sites throughout the entire area. The following summarizes the results of SEA's review.

Alternative B (Proposed Action)

A total of 228 known cultural resource sites are within 1.0 mile of Alternative B. Of the known sites, 169 are prehistoric, 49 are historic, 3 have both prehistoric and historic components,

[1] Area of potential effects means the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

and 9 are of unknown cultural affiliation. Fifty-one of the sites are eligible for or listed on the National Register of Historic Places (NRHP).

There are 32 sites within the right-of-way for Alternative B. Twenty-three of the sites are prehistoric, 8 are historic and one is of unknown cultural affiliation. Six of the sites, 2 historic and 4 prehistoric, are eligible for the NRHP.

Some cultural sites served specialized ceremonial functions as previously discussed in Section 4.1.13. Although none of these types of sites are recorded within the project area, it is very likely that unknown sacred sites and Traditional Cultural Places (TCPs) occur throughout the area.

Alternative C (Modified Proposed Action)

There are 312 known sites within 1.0 mile of the proposed Alternative C. These include 217 prehistoric, 48 historic, 4 with both prehistoric and historic components and 43 with unknown cultural affiliation. Of these, 49 are eligible for or potentially eligible for the NRHP, 134 have been determined ineligible or destroyed, and 129 have not been evaluated.

A total of 34 known sites would be located within the right-of-way for Alternative C. Of these, 4 are eligible for the NRHP, 10 are not eligible and 20 have not been evaluated.

Alternative D

There are 229 known sites and 59 known isolated finds within one mile of the proposed alignment for Alternative D. Of the known sites, 88 are prehistoric and 42 are historic. The cultural affiliation of 91 of the sites is unknown, and 8 have both historic and prehistoric components. Of the known sites, 2 are listed on the NRHP, 34 are eligible for the NRHP and 117 are not eligible. The remaining 76 sites have not been evaluated.

Of the known sites, 36 would be within the proposed right-of-way. Five of the 36 sites within the proposed right-of-way are eligible for the NRHP and 1 is on the NRHP. Of the remaining 31 sites, 15 are not eligible for the NRHP and 16 have not been evalutated. Based on the known site density it is expected that additional cultural resources would be discovered that would be eligible for the NRHP. It is also expected that some of the cultural resources shall be eligible for the NRHP as TCP's.

Native American Issues

With the assistance of the cooperating Federal agencies, Wyoming SHPO, the cooperating agencies, Bureau of Indian Affairs and recommendations from individual Tribes, the Federally recognized Tribes with potential interest in the project area where identified. Consultation was initiated with these Tribes. Out of respect for cultural differences, the wisdom of elders and the historically unresolved issue of treaties, several Tribal groups/organizations were also invited to participate in the consultation meetings. It is the intent of the consultations that each Tribe is provided a reasonable opportunity to participate with the NEPA process in addressing the potential impacts of the proposed project (See Appendix I for MOA and Appendix J for PA). Consultation with Tribal entities in Wyoming would be similar to those discussed in Section 4.1.13.

Indian Trust Assets

ITA's (Indian Trust Assets) are properties, interests, or assets of an Indian Tribe or individual Indian over whom the Federal government has an interest through administration or direct control. Examples include lands, minerals, and timber, as well as water rights, hunting rights, fishing right, and other treaty rights. The sovereignty of Tribes and the trust relationship with the Federal government have been established and validated through treaties, court decisions, legislation, regulations, and policies.

Native Americans have raised concerns for a number of ITA's. These include wildlife, fisheries, vegetation, paleontological resources, cultural resources, and water quality. Additionally concerns about culturally important plants have been voiced during consultation meetings with the Tribes. The Tribes are concerned that the planned construction would make changes in or destroy the local abundance and distribution of plants traditionally used by the Tribes. Consultation is continuing concerning issues the Tribes have concerning culturally important plants.

4.2.14 SOCIOECONOMICS

The project area in Wyoming consists of the following five counties: Niobrara, Weston, Campbell, Crook and Converse.

4.2.14.1 Population and Demographics

The project area in Wyoming is primarily rural. Small towns and large ranches occur widely scattered throughout the study area counties. Table 4.2-12 lists the communities in the project area for which population information is available.

Table 4.2-12
Potentially Affected Communities and Populations

Community	Population
Newcastle	3,240
Upton	985
Moorcroft	768

Tables 4.2-13 through 4.2-15 show population, income and employment numbers for the affected counties and for the State of Wyoming.

4.2.14.2 Employment and Income

In the project area, the foundation of the economy in this region includes coal mining, uranium mining, oil and natural gas production, and agriculture. While these basic industries are still important to the economy, other sectors including services and retail have grown as the other industries have grown.

Agriculture, including crop farming and livestock production, has been a moderately stable component of the economy. However, the percentage of persons employed in agriculture has steadily declined through the years. For example, in Campbell County there has been a decrease from about 38 percent of the population employed in agriculture in 1960 to only 4 percent in 1990.

Per capita income increased significantly between 1985 and 1989. The average increase of the affected counties was 35.9 percent; whereas the increase for the State of Wyoming was 25.9 percent. The average increase of the median household income in the affected counties, between 1979 and 1989, at 39.6 percent, was above the State's increase of 35.5 percent.

The percent of people living below the poverty level increased by 41.4 percent in the State of Wyoming between 1979 and 1989. During the same time the number of people living below the poverty level in Niobrara County decreased 12.5 percent. Converse County it increased 56.6

percent, in Weston County it increased 10.0 percent and in Campbell County the number of people living below the poverty level increased 47.3 percent (Table 4.2-15).

Between 1986 and 1994, the unemployment rate decreased in the State of Wyoming. In each of the four affected counties, unemployment decreased from 44.7 percent to 68.4 percent (Table 4.2-29).

4.2.14.3 Public Services and Fiscal Condition

Public services are offered to the residents of most area communities. Nearly all larger communities have newspapers, elementary, middle and senior high schools in their community. Many of the communities have clinics and/or doctor and dentist offices. However, many of the communities do not have hospitals. Hospitals are found in the major cities (Gillette, Newcastle). Nearly all of the communities offer recreational facilities and churches. Some of the smaller communities have volunteer fire departments and rely on county sheriffs for public protection services.

County taxes are collected in all counties throughout the state of Wyoming. Tax revenue is derived from the assessed value of property located within each county. Revenue is distributed among county, cities and townships to provide additional funding for public services. Funding is used to help support schools, social services, road and bridge maintenance, fire departments and criminal justice services including county and local courts, jails and police. Other services include libraries, zoning and planning and publication of county related documents. Table 4.2-16 provides a summary of tax data for each county.

Table 4.2-13
1996 Statistical Information for the Counties Potentially Affected by the New Construction of the DM&E Rail line and for the State of Wyoming

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[3]	Percent below poverty level[3]	Unemployment Rate[1]	Acreage in Farmland (1,000)[4]	Number of Farms[4]	Average Size of Farms (acres)[4]
State of Wyoming	475,991	11.5	12,311	27,096	11.9	5.3	32,876	8,716	3,772
Niobrara County	2,554	3.4	11,816	20,947	17.0	3.6	1,345	278	4,837
Weston County	6,560	3.2	11,263	26,213	9.8	5.9	1,485	231	6,427
Campbell County	30,891	5.4	13,596	37,055	8.4	5.4	2,704	476	5,681
Crook County	5,612	0.7	10,322	20,936	13.5	4.3	1,542	442	3,489
Converse County	11,704	8.8	12,023	27,713	11.9	5.4	2,363	305	7,748

1996 County and City Extra, Annual Metro, City and County Data Book. Edited by Courtenay M. Slater and George E. Hall. Berman Press, Lanham, MN, 1996.
[1] 1994 Data; [2] 1990 Data; [3] 1989 Data; [4] 1992 Data

Table 4.2-14
1988 Statistical Information for the Counties Potentially Affected by the New Construction of the DM&E Rail line and for the State of Wyoming

Affected Area	Population[1]	Percent Minority[2]	Per Capita Income[3]	Median Income[4]	Percent below poverty level[4]	Unemployment Rate[1]	Acreage in Farmland (1,000)[5]	Number of Farms[5]	Average Size of Farms (acres)[5]
State of Wyoming	507,000	2.87	9,782	19,994	7.9	9.0	33,500	8,861	3,781
Niobrara County	3,100	NR	6,749	12,830	16.0	9.4	1,335	260	5,136
Weston County	7,900	NR	9,043	20,021	7.4	9.0	1,488	226	6,584
Campbell County	36,700	1.25	12,057	26,060	4.8	9.9	2,843	444	6,404
Crook County	6,000	NR	7,988	16,557	9.9	8.1	1,549	442	3,503
Converse County	13,900	NR	9,157	22,693	6.4	11.1	2,395	306	7,825

1988 County and City Data Book, U.S. Department of Commerce Bureau of the Census. U.S. Government Printing Office, 1988.
[1] 1986; [2] 1984; [3] 1985; [4] 1979; [5] 1982
NR = Not Reported

Table 4.2-15
Comparison of Statistical Information for the Counties Potentially Affected by the New Construction of the DM&E Rail line and for the State of Wyoming

Affected Area	Population (86-94)	Percent Minority (84-90)	Per Capita Income (85-89)	Median Income (79-89)	Percent below poverty level (79-89)	Unemployment Rate (86-94)	Acreage in Farmland (1,000) (82 - 92)	Number of Farms (82 - 92)	Average Size of Farms (acres) (82 - 92)
Wyoming	-6.1	300.7	25.9	35.5	50.6	-41.1	-1.9	-1.6	-0.2
Niobrara	-17.6	NA	75.1	63.3	6.3	-61.7	0.7	6.9	-5.8
Weston	-17.0	NA	24.5	30.9	32.4	-34.4	-0.2	2.2	-2.4
Campbell	-15.8	332.0	12.8	42.2	75.0	-45.5	-4.9	7.2	-11.3
Crook	-6.4	NA	29.2	26.4	27.6	-50.4	-0.4	No Change	-0.4
Converse	-15.8	NA	31.3	22.12	85.9	-51.4	-1.3	-0.3	-1.0

Table 4.2-16
County Assessed Value and Taxes Collected - Wyoming

County	Market Value			Collected Taxes		
	1996 or 1999*	**1997**	**1998**	**1996 or 1999***	**1997**	**1998**
Niobrara	27,701,695*	34,321,052	33,275,890	1,895,326*	2,306,706	2,254,170
Weston	53,241,594*	65,770,476	61,148,238	3,761,474*	4,869,750	4,221,198
Campbell	1,435,820,219*	1,587,776,214	1,495,260,165	87,412,881*	98,904,057	90,579,407
Crook	63,806,553*	91,122,589	86,103,328	4,354,961*	6,397,434	5,851,442
Converse	272,678,786	279,346,685	286,990,621	16,373,093	18,346,282	17,232,158
Total	**1,854,248,847**	**2,058,328,061**	**1,962,778,242**	**113,797,735**	**130,824,229**	**120,138,375**

4.2.15 ENVIRONMENTAL JUSTICE

Executive Order No.12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (Order), directs individual Federal agencies to develop approaches that address environmental justice concerns. Although the Order does not require independent agencies such as the Board to conduct environmental justice analyses, potential environmental justice issues were raised during the scoping process. SEA conducted an investigation of potential environmental justice issues because:

- the President requested agencies to comply with the Order, particularly during the NEPA process.
- the Council on Environmental Quality (CEQ) guidance and the draft Environmental Protection Agency (EPA) guidance on environmental justice emphasize addressing environmental justice concerns in the NEPA context.
- the Board is responsible for ensuring this project is consistent with the public interest.
- environmental justice concerns were raised during the scoping process.

The purpose of Executive Order No. 12898 is to identify and address disproportionately high and adverse impacts to minority and low-income populations potentially occurring due to agency actions. SEA investigated whether potential environmental justice communities were present within the project area. Census information was obtained for each county within the project area. For organizational purposes, individual counties are divided into census tracts and census tracts into census block groups. Statistical information at the census block level was obtained and reviewed for those census block groups that would be crossed by any of the Extension Alternatives. Individual census block groups were determined to potentially be minority or low income based on criteria developed by the EPA and SEA. These criteria are:

- At least one-half of the census block group population is of minority status.
- At least one-half of the census block group population is of low-income status.
- The percentage of minority population in the census block group is at least 10 percentage points higher than the minority population percentage for the county in which the census block group is located.

- The percentage of low-income population in the census block group is at least 10 percentage points higher than the low-income population percentage for the county in which the census block group is located.

In Wyoming, two census block groups, one in Weston County and one in Niobrara County, were identified as potential environmental justice communities because the percentage of their low income populations exceeded the low income percentage for their respective counties by 10 or more percentage points.

4.2.16 RECREATION

Much of the recreation in the study area involves outdoor game activities. Lakes and reservoirs in the area that are fished include the Black Hills Power/Light Reservoir, Gillette Lake, LAK Lake and Glendo Reservoir. The Gillette Fishing Lake, a 25-acre reservoir on Donkey Creek located within the City of Gillette, is heavily fished. The Wyoming Game and Fish Department stocks the lake with game fish. In addition, some game fish are found in the Powder, Cheyenne, Little Powder and Belle Fourche Rivers. Also, many small stock ponds and reservoirs are fished lightly, however, the precise number of ponds producing game fish is unknown.

Another outdoor recreational activity is hunting. There are year-round hunting opportunities in the project area. Pronghorn, antelope, mule deer, whitetail deer, elk, sage grouse, sharptail grouse, waterfowl, dove and small game are hunted in the fall. Bobcat, mountain lion, and small game are hunted in the winter. In the spring and fall, turkeys provide hunting opportunities. There is year-round hunting for coyotes, red fox, jack rabbits, prairie dogs and animals classified as predators.

Other outdoor recreational activities that are predominant in the project area in Wyoming are camping, skiing, horseback riding and wildlife observation.

There are not many parks within project area due to the rural nature of the area, since parks tend to be located close to towns and cities. There is one roadside park located just north of Riverview in Niobrara County.

Some of the recreation facilities in the project area include ballfields, tennis courts, playgrounds, soccer fields, basketball courts, picnic shelters, swimming pools, skating facilities and volleyball courts. Campbell County has a multi-event facility, CAM-PLEX, that hosts horse racing, rodeos, livestock shows, fairs and concerts.

4.2.17 AESTHETICS

4.2.17.1 Visual Resources

There are no wild and scenic rivers in the project area of Wyoming.

The project area in northeastern Wyoming has gentle rolling plains, wide open prairies, mountains, sunsets and a variety of wildlife. Northeast Wyoming consists primarily of grasslands and open rangeland. Drainages in the area have cut deep channels and wide floodplains, with steep sideslopes. Badlands-type formations occur scattered throughout the area. Slopetops are generally wide, flat tables. High points in the area can provide spectacular views, not necessarily of unique or scenic areas, but for great distances, often with little or no evidence of human occupation or development. These viewsheds provide the observer a feeling of vastness and opportunity to view an area likely similar to what was present prior to Euro-American development. No established scenic overlooks or vantage points are known in the area. However, many parts of the project area are considered scenic by the residents and area visitors.

Of the areas containing valuable scenic settings, only those under the management of the USFS have visual management objects. Under the current USFS grassland plan, lands on the TBNG have been assigned a visual quality management object (VQO). VQO's are used to define acceptable degrees of alteration of the natural landscape. Approximately 85 percent of the USFS land potentially crossed by project alternatives have a modification VQO which allows for relatively large changes in the visual contrast. However, facilities constructed in these areas are required to use materials and methods which minimize their contrast with the surrounding landscape. The remaining 15 percent of USFS lands in the project area have a partial retention VQO. Partial retention VQO's are normally reserved for riparian corridors and other bodies of water. Development in areas with a partial retention VQO is restricted to activities which would not attact the attention of the casual observer.

Under the proposed USFS grassland management plan, scenic integrity levels (SIL) ranging from high to low are assigned to all proposed management areas. A high SIL indicates that human activity is not scenically evident, a moderate SIL indicates that valued landscape character appears slightly altered, and a low SIL indicates that valued landscape character appears moderately altered. For the proposed project area, SIL's are are mostly in the moderate to low range. Only approximately 10 percent of the potential project area would have a high SIL rating.

4.2.17.2 Nightlights

The project area contains widely scattered development, whether it be small communities, residences, or industrial sites. There are few sources of night lights. What lights are present are associated with rural residences in the form of house lights and other security lighting. Communities have street lights, residential, commercial and industrial facilities lighting and security lighting. However, the rural nature of the area provides numerous opportunities where the observer would see few if any lights when viewing in all directions. This lack of light pollution provides clear views of stars and other features in the night sky as well as providing the viewer a perception of isolation.

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4.3 RAIL LINE RECONSTRUCTION IMPACTS

Approval of the proposed Powder River Basin (PRB) Extension Project would require the reconstruction of the existing DM&E rail line in South Dakota. The potential impacts related to reconstruction and operation of the existing rail line are discussed in this Section. These impacts include those anticipated to occur along the portions of the existing rail line for which corresponding alternative alignments (bypasses) are not being evaluated. In South Dakota, this includes all portions of the existing rail line except for the portion of the existing rail line from 3.5 miles east of Brookings to 8.0 miles west of Brookings. The potential impacts associated with the proposed alternatives for Brookings are discussed in Section 4.9.

4.3.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would result from the Board denying DM&E the authority to construct a rail line extension into the PRB. For DM&E's existing rail line in South Dakota, the No-Action Alternative would result in no reconstruction activities related to system wide rehabilitation of the existing rail line and no operational changes in existing train activity or related to the transport of PRB coal.[1] None of the following impacts associated with reconstruction of the existing rail line would occur:

- disruption to adjacent land uses,
- disturbance to and erosion of soil,
- discovery and recovery, or possible damage or destruction of archaeological, historical, and paleontological resources,
- clearing and trimming of vegetation,
- disturbance to and loss of wildlife and their habitat,
- air emissions from construction vehicles and fugitive dust,
- increases in noise from construction equipment,
- disruption of traffic flow and potentially increased accidents at grade crossings, and
- increased economic activity due to construction workers.

[1] The Board's approval authority does not generally extend to changes or improvements in rail infrastructure or operations that are limited to existing railroad right-of-way. As such, DM&E could rehabilitate its existing rail line and increase rail traffic on its existing rail line at any time, even should the Board deny the PRB Extension Project. However, while DM&E has indicated such system-wide renovations are necessary, it stated in its Application to the Board, reconstruction of the existing rail line would not be possible without the revenues generated by the PRB Extension Project.

Additionally, none of the operational impacts would occur. Operational impacts associated with the anticipated increase in rail traffic would occur such as:

- increased noise levels from passing trains and whistle soundings,
- increased air emissions from locomotives,
- increased opportunities for vehicle delays at grade crossings,
- safety concerns for trains, vehicles, and pedestrians,
- disturbance and mortality to wildlife,
- improvement of DM&E's safety record due to improved rail line condition, and
- additional jobs and tax revenues generated by increased railroad activity and improved railroad facilities

Although the No-Action Alternative would not result in any changes to the existing environment, it is likely the No-Action Alternative would result in continued deterioration of DM&E's existing system. DM&E's safety record could be expected to remain among the worst in the nation (Tables 1-1 to 1-3) and potentially worsen as the condition of the existing rail line deteriorates. Service and reliability concerns of existing shippers discussed in Chapter 1, would continue, reducing the competitiveness of shippers in their respective markets. This lack of competitiveness and rail service reliability would likely result in a greater reliance of shippers on truck transportation, resulting in potentially hundreds of trucks being added to local roadways. Increased truck numbers would increase wear on area roads and reduce vehicle safety. Impacts to wildlife, including disturbance and mortality from passing trains, would continue at present levels. In summary, the present condition of the DM&E system has impacts on rail service efficiency and reliability, and both rail and vehicle safety in South Dakota (Tables 1-1 to 1-3).

The Board, in its December 10, 1998 decision, indicated that absent the funds generated by DM&E's proposal, DM&E could cease to exist as a viable railroad. Moreover, it appears unlikely that another rail carrier would acquire the DM&E system given its deteriorated condition and limited revenue base. Therefore, rail service along the existing system would likely cease. The existing shippers along the rail line, accounting for approximately 60,000 rail cars per year, would lose rail service. Because one rail car transports the equivalent of four trucks, a significant number of additional trucks could be added to local roads. Other shippers would be unable to competitively convert to truck transport and would be required to relocate to areas with rail service or cease to operate. These shippers include grain elevators serving the local agricultural communities. Loss of rail service and shippers would require local farmers to transport grain and other products greater distances for shipment, increasing operating costs for an already stressed agricultural economy. Increased reliance on trucks would increase air emissions from vehicles due to truck transport being less fuel efficient than rail transport. Wear on local roads would increase. Vehicle safety at grade crossings would not be an issue as trains would no longer

operate at these locations. However, increased levels of truck traffic would reduce the safety of area roads. Numerous jobs associated with railroad operation and maintenance would be lost as well as jobs provided by shippers forced to relocate or close. Revenue generated to the counties through taxes and employee spending would be lost. Other businesses used by employees would experience reductions in revenue. Loss of rail service throughout the project area could result in economic hardship to those whose livelihood depends on the railroad, such as DM&E employees, shippers, and farmers.

4.3.2 EXISTING RAIL LINE RECONSTRUCTION

The following discusses the potential impacts associated with the reconstruction of the existing DM&E rail line in South Dakota on the natural and human environment of the project area. Rail line reconstruction would generally involve only replacement of rail bed ballast, ties, and rail. In some locations, earthmoving and excavation may be required to repair the rail bed.[2] The majority of existing bridges and culverts would either be replaced or upgraded. A detailed description of rail line reconstruction is provided in Chapter 1. Both potential reconstruction and operational impacts resulting from rail line upgrading are presented.

4.3.3 CLIMATE

The climate of the project area would not be impacted by the reconstruction of the existing DM&E rail line.

4.3.4 TOPOGRAPHY

When the existing DM&E rail line was constructed across South Dakota, alterations in the topography immediately adjacent to the rail line were necessary. Low areas and valleys were filled, hill and high points were cut-through in order to provide a rail bed grade suitable for train operations. These cuts and fills likely altered local drainage patterns, and in some cases, streams may have been channelized or realigned to accommodate the rail line. Most of these changes took place over 100 years ago. No additional cuts or fills, modifying the topography of adjacent areas are anticipated. However, in some areas, the existing rail line grade may be raised or flattened to

[2] DM&E has indicated that in an attempt to resolve rail bed stability problems along the Bad River, it will be rebuilding the existing rail bed adjacent to the existing rail bed on the side away from the river. This new rail bed would involve approximately 30 miles of construction but DM&E has indicated construction along the Bad River would be confined to its existing rail line right-of-way. SEA has conservatively considered that all the area within DM&E's existing right-of-way would be disturbed by reconstruction activities. Additionally, construction of an off-set rail bed and rail line in the Bad River area would be similar to construction of rail line siding. Therefore, SEA's analysis includes the potential impacts that could be expected from construction of the off-set alignment.

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[2] DM&E has indicated that in an attempt to resolve rail bed stability problems along the Bad River, it will be rebuilding the existing rail bed adjacent to the existing rail bed on the side away from the river. This new rail bed would involve approximately 30 miles of construction but DM&E has indicated construction along the Bad River would be confined to its existing rail line right-of-way. SEA has conservatively considered that all the area within DM&E's existing right-of-way would be disturbed by reconstruction activities. Additionally, construction of an off-set rail bed and rail line in the Bad River area would be similar to construction of rail line siding. Therefore, SEA's analysis includes the potential impacts that could be expected from construction of the off-set alignment.

provide a more efficient operating grade. Adjustments in grade are expected to be minimal and accomplished within the existing rail line right-of-way. Drainage patterns and topographic conditions have been re-established along the existing rail line, with the rail bed being a significant feature. As part of this project, culverts and bridges would be replaced and the rail line reconstructed. Installation of new bridges and culverts would be done in a manner that would not alter the drainage pattern of area streams and rivers. Some minimal channelization or relocation of drainages may be necessary for installation of bridges and culverts. This would occur only in the immediate vicinity of the crossing structure and would not be expected to significantly alter stream drainage.

4.3.5 GEOLOGY AND SOILS

4.3.5.1 Unique Geological Formations

No unique geological formations, as defined in Section 4.1.3.1 would be impacted by reconstruction or operation of the existing DM&E rail line.

4.3.5.2 Geologic Hazards

Chapter 4, Section 4.1.3.3 gives a detailed description of the geological hazards associated with the project. It is unlikely that the process of rebuilding the existing DM&E rail line would change the current probability of a hazardous geological episode. No potentially hazardous geological areas, such as slumps, landslides, or karst topography would be affected by reconstruction or operation of the existing rail line.

4.3.5.3 Soil Impacts

Approximately 7,684.8 acres of soil could be disturbed within the existing right-of-way during reconstruction. Soil impacts from the reconstruction of the existing DM&E rail line in South Dakota could include soil loss through erosion and handling, decreases in favorable physical properties, and reduction of biological activity. Increases in soil erosion due to wind and water runoff could occur during reconstruction along the existing rail line. Erosion rates are expected to be moderate in the eastern project area (generally east of Pierre) due to soils being less susceptible to erosion, generally flatter terrain, but a greater amount of precipitation. Erosion would be most likely from wind and water in this region, as these soils are composed of glacial till, outwash, and clay. Areas cleared of topsoil, denuded or disturbed during construction, would be susceptible to erosion because subsoils tend to absorb water more slowly than topsoils, increasing the potential for runoff. Reduced absorption could be aggravated by compaction from equipment operation making soils even less permeable to water infiltration. Reduced absorption would lead to increased runoff volumes and speeds capable of scouring surface soils.

The soils in western South Dakota (west of Pierre) would be more prone to erosion due to soils being low in organic matter and the terrain being steeper. Erosion would occur primarily from wind and water in this region.

The physical properties of soils in disturbed areas could be changed from the conditions prior to reconstruction. Excavation of soils could result in the loss of the natural soil profile, destruction of soil structure, and loss of organic matter due to mixing and dilution. These changes could adversely affect soil productivity due to decreased soil-water holding capacity and aeration. However, along the majority of the right-of-way, soils were subject to previous disturbance and excavation during initial construction of the rail line. These soils have since recovered and developed organic matter and topsoil and would be expected to so so again following reconstruction. Recuction in soil productivity would not be significant because soils within the right-of-way would only be required to support grassy vegetation for ground cover. Any disturbance to soils within the existing rail line right-of-way would not be expected to have significant long-term impacts to soil resources.

The existing rail line would be adjacent to approximately 207.1 miles of land designated as prime farmland. Because reconstruction activities would be limited to an existing, disturbed rail line right-of-way which is not available for agricultural use, impacts to prime farmland would be unlikely. However, in the unlikely event reconstruction activities would be required outside the right-of-way, prime farmland could be impacted. Prime farmland is abundant in South Dakota and any areas where it might be impacted by this project would be small and localized. No operational impacts to prime farmland are expected.

Missouri River Bridge

Soil contamination could occur during rehabilitation of the existing bridge or construction of a new bridge in the event of an accidental spill of hazardous materials such as fuel and lubricants associated with construction acitivities. New construction would require realignment of the existing rail line and construction of new piles and footings for the bridge. Soil disturbance associated with these activities would contribute to increased soil loss and erosion during bridge activities. Potential contamination could also occur during operation in the event of an accidental spill or derailment. If removal of the existing bridge is required after construction of a new bridge, soil disturbance and erosion would occur during salvage activities.

4.3.5.4 Paleontological Resources

Paleontological resources, as described in Section 4.1.3.5 are present throughout South Dakota and could be encountered in the project area. Only minimal excavation is anticipated during reconstruction and excavation and would largely include surface earthwork within previously disturbed areas. The reconstruction and operation of the existing rail line is not anticipated to have any impact on paleontological resources.

Missouri River Bridge

No impacts to paleontological resources are anticipated during rehabilitation of the existing bridge. Construction of a new bridge, or removal of the existing bridge could potentially encounter paleontological resources during excavation activities along the Missouri River. However, the likelihood of such an encounter is considered low.

4.3.6 LAND USE

The potential impacts to the land use along the existing rail line related to the rebuilding of the existing DM&E rail line and the proposed increase in traffic were evaluated. The land uses evaluated included agricultural, residential and business/industrial, minerals and mining, public facilities, Federal, state and reservation/treaty lands, and utility corridors. The potential impacts to each of these land use categories are discussed below for rail line reconstruction and operation.

4.3.6.1 Agriculture

Agricultural lands potentially affected by the project include cropland and pasture land. The existing rail line is adjacent to approximately 293.0 miles of cropland and approximately 176.7 miles of pasture land for a total of 469.7 miles of agricultural land. Reconstruction activities would primarily be limited to the existing right-of-way. Therefore, reconstruction related impacts to agricultural lands would be minimal, limited to any small scattered areas where reconstruction activities may be required outside the existing rail line right-of-way. Following reconstruction, the rail line right-of-way would be fenced and other land uses prohibited within the right-of-way.

In some cases, agricultural practices have encroached on the right-of-way. In these small areas there could be loss of crops, hay, or livestock forage, soil compaction, and fence damage. Future use of the lands within the right-of-way would be prohibited, resulting in these areas being permanently converted to rail use. This small conversion of agricultural land to railroad right-of-

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4.3.6.2 Residential

Reconstruction of the existing DM&E rail line would be limited to the existing right-of-way and would pass adjacent to approximately 1.0 mile of land classified as residential. Reconstruction activities in or near residential areas could result in temporary impacts, including general ground disturbance, inconvenience from noise, dust, traffic congestion, and emissions generated from construction equipment.

Noise disturbance during reconstruction would be the primary impact to adjacent residences. Although reconstruction activities are expected to occur during daytime hours, the use of two-shifts would extend the reconstruction day into the later hours of the evening. Construction noise and lighting between the hours of 8 p.m. and 11 p.m. may be sufficient to impact the ability of adjacent residences to enjoy their evenings at home, both inside and out, and enjoy their usual sleep patterns. Equipment maintenance activities are anticipated to occur between midnight and 7 a.m. The associated noise and lighting may disturb adjacent residences. However, these impacts would be limited to the period of reconstruction in the vicinity of these residential areas, estimated to be from a few days to a few weeks.

The presence of construction equipment and materials would likely be a draw to children in residential areas, potentially posing a safety hazard. Adequate site security and lighting in these areas should be provided to minimize any safety hazards.

Long-term impacts associated with the operation of increased train traffic over the rail line would include increases in wayside and horn noise and locomotive emissions, increases in accident frequency at grade crossings, and traffic congestion. The number of noise sensitive receptors experiencing potentially adverse noise levels is discussed in greater detail in Section 4.3.7. Additionally, real estate values may be affected by the increased number of trains resulting in residences adjacent to the rail line becoming less desirable to potential buyers. Impacts to real estate values may occur. However, some of the impacts would be off-set by the potential increases in population resulting from the influx of construction workers requiring lodging and the long-term increase in the number of railroad related jobs. The increase in population and employment would result in individuals relocating to the area and acquiring housing. This influx of workers and their families would likely result in a stabilizing effect on the real estate market in the larger communities along the rail line as these would be where most of the workers would be expected to relocate due to the services they provide. In smaller, more rural communities, real estate values are likely already depressed due to struggling agricultural economies. Increased rail traffic could make these residential areas even less desirable, further reducing residential real estate values. Specific impacts are difficult to quantify as they may be significant in some areas but not in others, or to one home owner and not another, depending on the overall real estate market of the area and the concerns of the buyer. Overall, some impact is expected. However, while the impact is expected to be negative, it is unknown to SEA if it would be significant.

Missouri River Bridge Impacts

During reconstruction of the existing bridge, or the building of a new bridge, short-term and long-term impacts could occur to the six residences within 500 feet of the bridge. Short-term impacts would result from noise, increased traffic on area roads, and a decrease in air quality from construction activities and equipment. These impacts would be temporary, lasting only for the duration of the bridge construction, which, however, could last for two to three years. During bridge operation, these residences would be exposed to increased noise and air emissions from trains using the bridge. These residences could experience significant increases in noise levels (see Section 4.3.9.1 for SEA's detailed noise analysis). In addition, the real estate values of the residences close to the bridge may decline as a result of the decrease in the quality of life that could result from increased rail traffic, as previously discussed.

4.3.6.3 Business and Industrial

The project would be adjacent to approximately 33.1 miles of business and industrial land. Reconstruction activities in or near the business or industrial areas could result in temporary impacts related to inconvenience to employees and patrons from accessability problems, noise, dust, and congestion generated by reconstruction equipment, vehicles, and workers. These impacts would be short-term, occurring only while reconstruction is occurring in the vicinity of the business, ranging from a few days to a few weeks. Some temporary reductions in patronage may occur due to patrons selecting to do business at other establishments rather than cope with any reconstruction related inconveniences. However, following reconstruction, patrons would be expected to return. Additionally, if similar businesses are located elsewhere along the rail line in the same area, patrons of that business may do business at locations formerly impacted by reconstruction activities when such activities are impacting their usual places to do business. Because impacts would be temporary, no significant impacts to business and industrial land use due to reconstruction are anticipated.

Long-term impacts to business and industrial land use associated with operation of increased train traffic would include noise, traffic delays and congestion associated with reduced access from blocked crossings, and the potential reduction in patronage associated with these impacts. SEA does not consider commercial or industrial facilities as noise sensitive receptors as they are places of business with high levels of activity and are only subject to noise impacts during business hours. Additionally, rail operations are considered an industrial use and are considered compatible with other industrial land uses. Therefore, they are not included as noise sensitive receptors in the discussion of noise impacts in Section 4.3.7.

Noise generated by passing trains could cause disturbances to nearby businesses. However, numerous disturbances and other sources of noise currently impact these businesses, resulting in higher, normal noise levels and regular disturbances. Additionally, trains would only impact businesses during normal business hours during the work-week and individual disturbances would be brief, limited to 2.1 to 2.4 minutes required for an individual train of 115 cars or 135 cars, respectively, to pass. The inconvenience associated with patrons trying to converse with proprietors and access the businesses across grade crossings occasionally blocked by trains may cause some patrons to take their business elsewhere. Business in close proximity to the rail line, particularly those with increased sensitivity to noise such as hotels like the Best Western Ramkota in Pierre, movie theaters, or restaurants would be most at risk of being inconveinienced.

The general level of background noise within businesses such as theaters and restaurants would reduce the potential disturbance from noise created by passing trains. In theaters, the volume of sound produced during the movie would make it unlikely for patrons to be disturbed by a train passing event. In restaurants, conversations between patrons and staff as well as general noise from restaurant activities, such as stacking dishes and background music, would also reduce the level of disturbance in these establishments. Hotels, however, lack the presence of background noise. Patrons are generally provided with a quiet environment within the hotel. Noise abatement measures used in the construction of these facilities reduce disturbance due to noise generated outside the business premises. The businesses in areas adjacent to the rail line which do not currently have noise abatement measures incorporated as part of their construction, particularly older buildings, would be more susceptible to higher noise levels than those that have abatement measures.

The incidence of noise disturbance would increase according to the amount of time patrons are present in the business. Generally, customers spend an average of two hours at a time in restauraunts and theaters. Based on an even distribution of train passing events over a 24-hour period at the 100 MNT level of operations (37 trains per day), patrons would potentially experience two train passing events during the time they are on the premises. However, hotel patrons would potentially experience 10 train passing events (based on 8 hours of sleep and 2 hours of leisure and preparation time). Disturbance would most likely occur to patrons whose rooms have exterior walls on the rail line side of the hotel. Disturbance during nighttime hours could be a significant impact for hotels located in proximity to the rail line if noise abatement measures are not utilized and patrons are disturbed to the point of selecting other lodging. In some cases, patrons would have no choice but to use the existing lodging facilities due to no other available services in the area.

For those businesses and industries that are currently served by DM&E, improved rail service should improve their ability to compete in the marketplace. Improved rail service and a better ability to compete may enable these businesses and industries to increase their profit margins and expand their operations. The value of these operations would be increased, as well as the real estate they occupy. Additionally, efficient rail service in the project area may make the region attractive to new business and industry, particularly in agricultural processes and services. Properties suitable for industrial development along the existing rail line could expect to increase in value.

Operational impacts to business and industrial facilities are expected to vary. Commercial businesses, particularly those susceptible to noise disturbance, may be negatively impacted, if significant measures are necessary to minimize noise impacts or by loss of patronage. However, facilities served by the rail line may see significant positive impacts due to improved marketplace competition. Land suitable for industrial development may increase in value. Therefore, overall impacts to business and industrial land use are expected to be positive. However, negative impacts, potentially significant, may occur to isolated businesses adjacent to the rail line.

4.3.6.4 Minerals and Mining

The existing DM&E rail line in South Dakota would pass 2.1 miles of strip mines, quarries, and gravel pits. The reconstruction of the existing rail line may lead to expansion of these operations if the materials they contain are suitable for rail construction. Their proximity to the rail line makes them a sensible choice for construction materials and the project would be expected to have a positive impact on them. Additionally, during operation and maintenance of the project, these facilities could continue to be used to provide materials for the rail line. Impacts to these land uses is expected to be positive.

4.3.6.5 Public Facilities

A variety of public facilities occur in close proximity to the existing rail line, such as schools, churches, medical facilities, parks, and recreational areas, as described in Section 4.1.4.5. During reconstruction of the existing rail line, these facilities would potentially be exposed to increased noise, dust, and vehicle emissions from reconstruction equipment. These impacts may reduce public use of some of the facilities or change use patterns, such as time of day or increased weekend usage when reconstruction is not occurring. The presence of reconstruction equipment and workers may result in congestions on local highways, affecting access to public facilities.

Additionally, traffic delays and detours may occur during reconstruction activities at grade crossings. Increased use of public facilities, including parks, churches, and medical facilities may occur due to use by construction workers. These impacts would be temporary and short-term, occurring only during the period of reconstruction in the particular region of the state served by any particular facilities. Delays or disruptions to movement of traffic could be locally significant. However, they would only occur for short periods of time along the rail line, primarily only for the few hours or days reconstruction activities would be taking place at any particular grade crossing. No property associated with public facilities would be required for reconstruction of the existing rail line.

Operation of the reconstructed DM&E rail line, with an increased number of trains operating at higher speeds has the potential to impact public facilities. General impacts to public facilities could include reduced access due to road crossings being blocked, increased noise, and traffic congestion, and reduced grade crossing safety. These impacts are discussed in greater detail in later Sections.

4.3.6.6 Federal Lands

4.3.6.6.1 Forest Service Lands

There are no Forest Service lands along the existing rail line to be reconstructed in South Dakota. Therefore, no impacts would occur to these lands along the existing DM&E rail line.

4.3.6.6.2 Bureau of Land Management Lands

There are no Bureau of Land Management lands along the existing rail line to be reconstructed in South Dakota. Therefore, no impacts would occur to these lands along the existing DM&E rail line.

4.3.6.6.3 Bureau of Reclamation Lands

The existing DM&E rail line in South Dakota, north of Canning passes through approximately 200 feet of land owned by Reclamation (Section 4.1.4.6.4). The land was purchased by Reclamation as part of the Oahe Unit, Pierre Canal project for the construction of a water syphon to allow water in the Pierre Canal to flow under the existing rail line. Construction of the Pierre Canal has been terminated indefinitely, and the syphon has not been constructed. However, any reconstruction activities necessary outside the existing railroad right-of-way would require coordination with Reclamation.

4.3.6.6.4 Fish and Wildlife Service Lands

The existing DM&E rail line in South Dakota passes within 1.0 mile of 12 Federal Waterfowl Production Areas. Table 4.1-6 lists these areas and their locations. Five of these areas are adjacent to the existing rail line and would be most likely affected by reconstruction and operational activities. Impacts to these areas would include increased noise resulting in disturbance to nesting waterfowl, mortality to nesting hens and chicks along the right-of-way, loss of wetland and upland habitats, and disturbance from human activity. These impacts are discussed in greater detail in Section 4.3.10.2.

Missouri River Bridge

Rehabilitation of the Missouri River Bridge could cause potential disturbance to land and facilities owned by the COE, such as temporary trail closures or disturbance necessary to realign existing trails. Construction of a new bridge would require more extensive activities along the river banks in proximity to bridge construction. Along the east bank, the proposed bridge would require the direct use of approximately 0.4 acre of COE recreation area. A two-acre public recreational area, owned by the COE, is located along the west bank of the bridge. Construction of a new bridge would require direct use of approximately 0.7 acre of the recreational area on the west bank. Following completion of the new bridge, ownership of the existing bridge would be transferred to another party, or the bridge would have to be removed according to U.S. Coast Guard (Coast Guard) regulations. Both rehabilitation of the existing bridge and construction of a new bridge would require a permit from both the COE and the Coast Guard. According to Coast Guard regulation, "The taking of any public recreation or historic place, facilities, structures, etc., will require preperation of Section 303 [formerly Section 4(f)] statements in accordance with the DOT Act of 1966".

4.3.6.7 Reservation and Treaty Lands

The existing rail line is within 10.0 miles of three Reservations (Section 4.1.4.7). Yet, it crosses no Reservations. As stated in Section 4.1.4.7, the Treaty of 1851 established all lands west of the Missouri River in South Dakota, for the Sioux Nation. Today the rights to these treaty lands, including the counties Haakon, Stanley, Jackson, and Pennington in the project area are disputed by several Tribes. The portions of the existing DM&E rail line in these counties currently cross these disputed lands.

4.3.6.8 State Lands

State lands within or near the project area include State Parks and State Game Production Areas. These areas occuring along the existing rail line are described in Chapter 4, Section 4.1.4.8.

State Parks

No state park land is crossed by or adjacenty to the existing rail line. However, state park land located in close proximity to the rail line would experience short-term and long-term impacts associated with the reconstruction and operation of the rail line. Impacts to state lands could include increased noise and dust, potential fire hazards, and increased air emissions.

State Game Production Areas

The existing rail line is within 1.0 mile of seven State Game Production Areas (GPA). The existing rail line is immediately adjacent to or passes through two (Bracken Slough GPA in Beadle Co. and Arikara GPA in Hughes Co.) such areas. Reconstruction of the rail line through these areas would be restricted to the existing right-of-way. No additional lands would be required, therefore no reductions in their size would result. Reconstruction noise and human activity would likely disturb local wildlife, resulting in animals seeking more secluded habitat. Reconstruction activity in these areas during periods of high public use, such as during fall and winter hunting seasons, would reduce their appeal to the public. However, most reconstruction activities would occur during the summer and for only a short period, ranging from several days to several weeks for each area. Summer activities such as hiking and fishing would be those activities primarily affected. These properties are generally small (1,200 acres or less) and the limited numbers of users could easily go to other properties during the reconstruction phase. Reconstruction should have little impact to these properties.

During operation of the project, the increased train traffic could make GPA areas less desirable to wildlife and the public due to increased disturbance to a natural setting. However, these areas are exposed to rail activities associated with current rail line operation and maintenance. Users of these areas have adapted to accept current disturbance. If adequate wildlife habitat is available, some wildlife would continue to use these areas. Increased train activity could delay vehicles attempting to access these areas as well as increase concerns for vehicle and pedestrian safety. Although some decline in area usage and decrease in habitat value could occur, impacts from increased operations are not expected to be significant.

4.3.6.9 Utility Corridors

Numerous utilities of all types are crossed by the existing rail line or utilize the existing right-of-way. Reconstruction and operation of the existing rail line has the potential to damage these utilities, resulting in loss of product, customer service, and in the case of natural gas or petroleum products, create potentially dangerous situations. DM&E would need to identify all utilities within the right-of-way and coordinate with the owners of those utilities to insure they are properly protected during reconstruction, and determine if they would require relocation or reconstruction to prevent future damage from rail operations. Provided this is done, the project would have no significant impacts on utilities.

4.3.7 WATER RESOURCES

4.3.7.1 Surface Water

The existing DM&E rail line in South Dakota crosses 7 rivers (Section 4.1.5.1), 230 intermittent streams and 16 perennial streams. Installation of bridges and culverts has the potential to increase erosion into surface waters and disturb bottom sediments. These impacts would result in increased total suspended solids (TSS) in surface waters, increasing stream sedimentation, changing sediment loading and deposition patterns in the stream, and reducing surface water quality. Reconstruction activities on either side of the water crossing may disturb vegetation adjacent to the stream, increasing the potential for erosion. Soil-disturbing activities and excavation, should they be required at or adjacent to water crossings, would have similar affects. In-stream work, particularly if vehicles are required to move into or across streams, would disturb bottom sediments and stream banks, also contributing to sediment in the water. Bank stabilization and channelization may be necessary for some crossings. These activities have the potential to change stream hydrology, altering water flow velocities and sediment loading and deposition patterns. Increased water temperatures, stream bank erosion, incising of stream channels, and reduction in stream meanders could result. Spills of fuel, lubricants, solvents, or other hazardous materials during reconstruction at stream crossings could introduce contaminants into the water, reducing water quality. However, any contaminants are expected to be present in small amounts, consisting of that amount necessary for operation of equipment, insufficient to cause significant impacts to surface water quality beyond the immediate crossing location.

The potential for these reconstruction impacts would be limited to the short period required for crossing reconstruction, indicated by DM&E to be approximately 14 days for bridge reconstruction (except for work related to the Missouri River bridge which is expected to take two construction seasons) and 1 to 2 days for culverts. Surface water impacts would be of highest concern during reconstruction of crossings of perennial streams, as water would be present in the stream bed, and during high water periods. Due to the short period necessary of crossing installation, it is likely many of the intermittent stream crossings would be installed and reclamation measures implemented without water ever being present in the stream channel, particularly in the drier areas of western South Dakota. In these instances, should a spill of hazardous substances occur, it could be contained and cleaned up without impacting surface water resources.

During rail line operation, surface waters could be impacted in the event of a derailment. Should diesel fuel or lubricants be released from locomotives or rail cars involved in a derailment, they could reduce water quality. Severe spills of fuel could degrade water quality for a substantial distance downstream of the spill until the spill is contained or diluted. Additionally, increased TSS would likely result if a derailment resulted in coal being spilled into the water. While these impacts could occur, they are considered unlikely due to the rail line being maintained in good condition and the derailment needing to occur at a stream crossing. The infrequent (necessary only once every several years) disturbance to bottom sediments and stream banks associated with bridge and culvert maintenance activities would be the most likely impacted during rail line operation. Such disturbances would be minor because they would involve little in-stream work or site disturbance. Additionally, during railroad operation, herbicide application within the rail line right-of-way to control vegetation could reduce water quality if herbicides are improperly applied or allowed to enter surface waters.

Missouri River Bridge

Rehabilitation of the Missouri River Bridge or construction of a new bridge across the Missouri River, between Pierre and Fort Pierre, South Dakota would cause an increase in TSS in waters of the Missouri River. Increased sediment and turbidity would result due to river bank disturbance and in-stream activities. New bridge construction would require the placement of 27 new piers within the river. This disturbance of the river bank on both sides of the river would contribute to increased erosion. Although reductions in water quality during new bridge construction would be limited to the period of pier installation, they would be greater than those expected to occur from rehabilitation of the existing bridge.

4.3.7.2 Wetlands

Impacts to wetlands are considered by the U.S. Army, Corps of Engineers (COE) to be temporary, long-term, or permanent, depending on the amount of time it would take for the reestablishment of a functional wetland.[3] Reestablishment within three years after reconstruction is considered a temporary impact. However, any reestablishment that takes longer than three years is considered long-term. The non-recoverable loss of a particular wetland or riparian area function is considered permanent. Rail line reconstruction would have the following impacts on wetland and riparian resources within the existing right-of-way:

- Permanent loss or alteration, due to placement of fill or dredging of substrate during reconstruction, resulting in a change in hydrology, soils, or the composition of vegetation which could be both temporary, limited to the reconstruction period, or permanent throughout operation of the rail line.

- Permanent or temporary degradation of the functions of wetland or riparian resources.

Wetlands located within the existing rail line right-of-way would be lost during reconstruction of the rail line. A variety of wetland types would be lost. Section 4.1.5.3 describe the various types of wetlands found throughout the project area and potentially lost.

To quantify potential impacts to wetlands along each alternative, the wetland acres were determined based on USFWS National Wetland Inventory (NWI) mapping.[4] The reconstruction activities have the potential to impact 197.0 acres of wetlands within the existing DM&E right-of-way. Section 4.1.5.3 and Table 4.1-12 provide a county breakdown of wetland acreage within the rail line right-of-way. These wetlands are expected to be lost due to reconstruction activities and construction of sidings.

Clearing of vegetation, excavation, grading, and placement of fill to create a raised rail bed for sidings or to repair the existing rail bed would likely result in a loss of any wetlands present. Reconstruction activities associated with rebuilding the existing rail line could require reconstruction equipment to work within or travel through wetlands. These activities would

[3] A reestablished wetland would be considered to be a functional wetland at such a time as it is capable of providing the functions performed by the original wetland. Such functions could include surface water retention, nutrient uptake, and wildlife habitat.

[4] National Wetlands Inventory (NWI) mapping is performed by the U.S. Fish and Wildlife Service (USFWS). Aerial photography is used to identify potential wetland areas, based on observations of water or vegetation in the photographs. NWI maps provide a useful guide as to the potential for wetlands. However, they may indicate wetlands where they do not actually exist, and may also indicate uplands in areas where wetlands do exist. Additionally, indicated wetlands are not based on criteria established by the U.S. Army Corps of Engineers for wetlands under its jurisdiction as per the Clean Water Act. Use of NWI maps does however, provide a useful means of comparing the potential wetland impacts of the alternatives.

result in damage to wetland vegetation, mixing and compaction of wetland soils, and potential alterations in site hydrology. If wetlands occur in areas where sidings would be constructed, portions of these wetlands within the right-of-way would be filled to provide rail bed for the sidings. Additionally, wetlands adjacent to a rail bed are generally undesirable to rail operators as they contribute to saturated soil conditions that may destabilize the rail bed. These areas would likely be filled or drained.

Additionally, if wetlands extend outward from the right-of-way, adjacent areas of wetlands may also be lost due to changes in surface water drainage flow, erosion, and sedimentation. Installation of rail line drainage structures may result in adjacent wetlands being drained. These indirect impacts are difficult to quantify due to lack of final design information. However, it is likely some wetlands would re-establish within the rail line right-of-way. These wetlands would likely be similar to those lost but smaller in size and of less value.

During project operation and maintenance, wetlands re-established in the right-of-way may be subject to impacts similar to those of reconstruction should maintenance activities require work in wetlands. These impacts would be sporadic and in confined areas. Contaminants, such as fuel, lubricants and herbicides could enter wetlands, damaging vegetation and contaminating water or soil due to improper handling, use, or in the unlikely event of a derailment. During project operation and maintenance, impacts to adjacent wetlands may also occur. However, impacts to these adjacent areas would be restricted to potential degradation of wetlands from maintenance activities and the potential introduction of contaminants in the event of a derailment or a spill.

Indirect impacts to wetlands could also result from reconstruction of the rail line. Soil disturbance in the right-of-way could increase sedimentation in adjacent wetlands. Increased sedimentation could reduce the size, water depth, or quality of the wetland. Installation of drainage structures may drain wetlands outside the right-of-way, resulting in additional wetland losses.

4.3.7.3 Groundwater and Wells

Possible contamination of surface aquifers in South Dakota could result from a fuel or contaminant spill during reconstruction or operation of the rail line. If a fuel or chemical spill occurred during reconstruction or operation of the rail line, it could cause contamination of groundwater aquifers. Any aquifer or well contamination resulting from use of the DM&E rail line would be considered significant. However, impacts to groundwater are unlikely due to the limited quantity of fuel and contaminants present during reconstruction and operation of the railroad. In addition, the rebuilt rail line is expected by DM&E to be safer than the current track in operation, and therefore less likely to experience derailments.

4.3.8 AIR QUALITY

Reconstruction and operation of the existing DM&E rail line would result in changes to the air quality of the project area. While emissions during both reconstruction and operation of the project would generally be consistent with the types of emissions currently present in the project area, increases in emissions would be expected.

Reconstruction related impacts to air quality would generally be localized around the area of reconstruction activity. However, some impacts would likely occur throughout the project area. Local air quality impacts related to reconstruction activity would be short-term and occur at several isolated, scattered locations at any given time during the two to three year reconstruction period. The primary reconstruction impact to air quality would be an increase in fugitive dust. These increases would occur from a variety of reconstruction activities. Increased traffic from construction workers and equipment on local gravel roads would stir dust from these roadways. Any excavation or earthmoving activities would also contribute to dust. As noted in Section 4.3.5.3, many of the project area soils are susceptible to wind erosion. Clearing of the right-of-way and earthmoving activities would expose these soils to increased opportunity for both wind and water erosion. Transport of fill material in uncovered trucks could also contribute to fugitive dust. Following completion of reconstruction and reclamation of the right-of-way, these impacts would no longer be expected to continue.

Emissions from reconstruction vehicles and equipment would also impact air quality. These impacts would primarily be confined to the right-of-way where reconstruction activities would be most concentrated. As noted above, the scattered nature of reconstruction and the short time periods that it may occur would spread equipment emission over a large area. Additionally, emissions would be dispersed by wind, preventing them from becoming concentrated. Vehicle and diesel emissions are common and widespread throughout the project area, although they occur at very low levels due to generally low traffic levels and only short, periodic times of high agricultural activity (planting, harvesting) spread over the growing season. Air emissions during reconstruction are not anticipated to reduce air quality in the overall project area due to their temporary and scattered nature.

During rail line operation, in-transit loss of coal from rail cars is expected to occur, potentially increasing fugitive dust along the rail line. However, fugitive dust emissions from these coal losses are intermittent and difficult to quantify. PRB coal has a high moisture content, averaging about 30 percent moisture.[5] The moisture in the coal tends to reduce fugitive dust compared to drier eastern coals that average about 10 percent moisture.[6] Also, the cooler climate of South Dakota and Wyoming tends to cause the coal to freeze together during colder times of the year, further limiting fugitive coal losses during these periods. During the warmer months, rain mixing with the clay in the PRB coal tends to crust the coal pile and may serve to reduce fugitive coal emissions during transport. Some coal losses would be expected during the drier part of the summer months. SEA identified no detailed studies that provided information on the amount of coal dust lost from rail transportation or the potential problems it could create. SEA contacted numerous state air quality and pollution control agencies to obtain input on the coal dust-loss issue. SEA contacted the South Dakota Department of Environment and Natural Resources (which also provided information on contacts with the North Dakota and Nebraska Departments of Natural Resources), Wyoming Department of Environmental Quality, Minnesota Pollution Control Agency, Colorado Department of Public Health & Environment, and the Missouri Department of Natural Resources. These states were contacted due to their inclusion in the project area, being known to have rail lines over which PRB coal is transported, or both. It was the opinion of these agencies that loss of coal dust does not represent a significant environmental hazard, and that in their experience, loss of coal in the size range to become airborne is an infrequent event. This position is largely based on lack of complaints about coal dust from persons along the coal transportation rail routes and the agencies' field personnel not observing coal dust blowing from open rail cars or settled along the rail lines. Based on this anecdotal evidence, SEA does not believe fugitive coal dust poses a significant environmental concern. However, it does acknowledge that some fugitive coal dust may be noticed along the rail line, potentially causing inconvenience to adjacent residents and businesses by requiring periodic washing of buildings, vehicles, and other outside surfaces.

SEA determined that the increases in rail traffic at each analyzed level of operation (20 MNT equal to 8 coal trains per day, 50 MNT equal to 18 coal trains per day, and 100 MNT equal to 34 coal trains per day) would exceed the Board's thresholds, found at 49 CFR 1105.7, for environmental analysis of air quality impacts. These thresholds require SEA to conduct detailed analysis of potential air quality impacts from reconstruction projects that result in an increase of eight or more trains per day in areas classified as attainment for all criteria pollutants. As all counties in the project area are classified as attainment, this threshold applies to SEA's analysis for this project. Additionally, the Board's regulations require SEA to evaluate potential air quality impacts on other portions of DM&E's rail system where rail traffic would exceed this

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[5] Lick, Robert. 1991. 1991 Keystone Coal Industry Manual. Robert Lick Publisher. Maclean Hunter Publications. Chicago, Illinois. 1991.

[6] Ibid.

threshold due to the proposed reconstruction project. Therefore, SEA conducted a detailed analysis of potential air quality impacts along the existing DM&E rail line to be reconstructed in South Dakota.

DM&E indicated in its Application that it intends to transport up to 100 MNT of coal per year and that interchanges with other rail carriers are available to route the coal to the users. However, because contracts for coal transportation have not yet been obtained by DM&E, SEA cannot reasonably determine the exact routes over which DM&E coal would be transported. Therefore, SEA cannot determine the rail lines which would exceed the Board's thresholds. SEA determined it reasonable for all the increases in rail traffic to occur along the existing DM&E rail line. Thus, SEA performed a system-wide analysis to determine the potential impacts for each of the proposed project Extension Alternatives on air quality that would occur as a result of this project along the entire DM&E rail line SEA's analysis included proposed emissions increases along the new Extension Alternatives and DM&E's existing rail line across South Dakota and Minnesota. SEA's analysis of air quality impacts along the existing rail line in South Dakota is contained in this Section. Air quality impacts from rail yards along the existing rail line in South Dakota are included at Section 4.10. The results of the air quality analysis for Minnesota are found in Chapter 3, Sections 3.2.8 and 3.4, and for the new Extension Alternatives at Sections 4.4 through 4.8 and 4.11.

SEA analyzed emissions (in tons per year) for sulfur dioxide (SO_2), hydrocarbons (HC),[7] particulate matter of less than 10 microns in diameter (PM_{10}), oxides of nitrogen (NO_X), carbon monoxide (CO), and lead (Pb). Emissions from DM&E locomotives along the existing rail line would represent an increase in the emissions observed for the counties through which the rail line passes. The project emissions due to increased rail line operations include those from diesel locomotives along the rail line and within rail yards. Emissions in rail yards that would be located along the existing rail line in South Dakota would be due primarily to locomotives idling while crews are changed, locomotives and rail cars are inspected, and potentially during minor maintenance and fueling activities. These rail yard emissions are included in Section 4.10.

[7] Hydrocarbons are a category of chemical substances containing the elements carbon and hydrogen. A variety of different hydrocarbon compounds are emitted by locomotives. EPA's locomotive emission factors were used to calculate the hydrocarbon emissions resulting from this project. Hydrocarbon emissions are a consideration in this analysis as many of them compose a subgroup of compounds known as volatile organic compounds (VOCs). VOCs can easily combine with other chemicals, including those in the air, to form ozone, one of EPA's criteria pollutants. Generally, one ton of VOC emissions will react to produce one ton of ozone. Therefore, VOC emissions provide a surrogate for potential ozone production. However, EPA's emission factors for locomotives do not include VOC emissions, only hydrocarbons. Therefore, SEA's use of hydrocarbon emissions as a surrogate for VOCs is overly conservative as only the VOC component of hydrocarbons would produce ozone.

The emission changes SEA calculated for the existing rail line in South Dakota are given in the following Section on a county-wide basis. The methodology SEA used for these calculations is provided in Appendix E, Air Quality Analysis Methodology. SEA compared the results of its analysis to the Environmental Protection Agency's (EPA) major source thresholds for stationary sources. EPA's major source thresholds for stationary sources provide the emissions level for each criteria pollutant at which a stationary source of that air pollutant would be required to apply for a major construction or operating permit. The use of threshold screening levels is consistent with previous SEA environmental analyses, as no thresholds are currently established for mobile emission sources, such as locomotives. Therefore SEA used the EPA stationary sources as screening values for emissions. If the projected county-wide emission levels exceeded the air quality screening levels shown in Table 4.3-1, then SEA performed a more detailed air dispersion modeling to determine if locomotive emissions would pose a potentially significant impact to air quality.

STB thresholds of eight trains or more per day would be exceeded in all South Dakota counties through which the existing DM&E rail line passes. SEA identified 11 counties in South Dakota that would be affected by increased locomotive emissions from this project. For each county, SEA summed air emissions increases from changes due to increased locomotive activity and compared them to the air emission screening thresholds shown in Table 4.3-1.

Table 4.3-1
County Emissions Screening Levels

Pollutant	Area Designation	Emissions Screening Levels (tons/year)
Nitrogen Oxides (NO_X)	1. Attainment/Maintenance for NO_2 2. Marginal/Moderate Ozone 3. Ozone Attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25

Table 4.3-1
County Emissions Screening Levels

Pollutant	Area Designation	Emissions Screening Levels (tons/year)
Volatile Organic Compounds (VOCs)	1. Attainment/Maintenance for Ozone 2. Marginal/Moderate Ozone non-attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25
Carbon Monoxide (CO)	1. Attainment/Maintenance for CO 2. Marginal/Moderate Ozone non-attainment	100
	CO Serious Non-Attainment	50
Particulate Matter less than 10 microns (PM_{10})	1. PM_{10} Attainment or Maintenance 2. PM_{10} Moderate Non-attainment	100
	PM_{10} Serious Non-attainment	70
Sulfur Dioxide (SO_2)	SO_2 Attainment or Non-attainment	100
Lead (Pb)	Pb Attainment or Non-attainment	0.6

A summary of the emission increases for the 20 million annual tons level of operation is shown in Table 4.3-2.

Table 4.3-2
Comparison of Emission Increases in South Dakota to EPA Thresholds for the 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Brookings	**174**	100	12	100	33	100	8	100	21	100	0.001	0.6
Kingsbury	**183**	100	13	100	35	100	9	100	22	100	0.001	0.6
Beadle	**213**	100	15	100	41	100	10	100	25	100	0.001	0.6
Hand	**151**	100	11	100	29	100	7	100	18	100	0.001	0.6
Hyde	89	100	6	100	17	100	4	100	11	100	0.001	0.6
Hughes	**232**	100	16	100	44	100	11	100	28	100	0.001	0.6
Stanley	**144**	100	10	100	28	100	7	100	17	100	0.001	0.6
Jones	79	100	5	100	15	100	4	100	9	100	0.001	0.6
Haakon	**190**	100	13	100	36	100	9	100	23	100	0.001	0.6
Jackson	67	100	5	100	13	100	3	100	8	100	0.001	0.6
Pennington*	131	100	8	100	22	100	14	100	14	100	0.0004	0.6

* Includes only those emissions along DM&E's existing rail line from Wall eastward.

A comparison of the emission increases for the 50 million annual tons level of operation is shown in Table 4.3-3.

Table 4.3-3
Comparison of Emission Increases in South Dakota to EPA Thresholds for the 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Brookings	**389**	100	27	100	75	100	19	100	47	100	0.002	0.6
Kingsbury	**408**	100	29	100	78	100	20	100	49	100	0.002	0.6
Beadle	**475**	100	33	100	91	100	23	100	57	100	0.002	0.6
Hand	**338**	100	24	100	65	100	16	100	40	100	0.001	0.6
Hyde	**199**	100	14	100	38	100	10	100	24	100	0.001	0.6
Hughes	**517**	100	36	100	99	100	25	100	62	100	0.002	0.6
Stanley	**321**	100	23	100	61	100	15	100	38	100	0.001	0.6
Jones	**169**	100	12	100	32	100	8	100	20	100	0.001	0.6
Haakon	**424**	100	30	100	81	100	20	100	51	100	0.002	0.6
Jackson	**148**	100	10	100	23	100	7	100	18	100	0.001	0.6
Pennington*	313	100	19	100	52	100	13	100	33	100	0.001	0.6

* Includes only those emissions along DM&E's existing rail line from Wall eastward.

A comparison of the emission increases for the 100 million annual tons level of operation is shown in Table 4.3-4.

Table 4.3-4
Comparison of Emission Increases in South Dakota to EPA Thresholds for the 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Brookings	**744**	100	52	100	**142**	100	36	100	89	100	0.003	0.6
Kingsbury	**779**	100	55	100	**149**	100	38	100	93	100	0.003	0.6
Beadle	**907**	100	64	100	**173**	100	44	100	**108**	100	0.004	0.6
Hand	**646**	100	46	100	**124**	100	31	100	77	100	0.003	0.6
Hyde	**380**	100	27	100	73	100	18	100	45	100	0.001	0.6
Hughes	**986**	100	70	100	**189**	100	48	100	**118**	100	0.004	0.6
Stanley	**613**	100	43	100	**117**	100	30	100	73	100	0.002	0.6
Jones	**323**	100	23	100	62	100	16	100	39	100	0.001	0.6
Haakon	**810**	100	57	100	**155**	100	39	100	97	100	0.003	0.6
Jackson	**283**	100	20	100	54	100	14	100	34	100	0.001	0.6
Pennington*	610	100	38	100	102	100	26	100	64	100	0.002	0.6

* Includes only those emissions along DM&E's existing rail line from Wall eastward.

For the 20 and 50 million ton per year options, NO_X, CO and SO_2 emissions are predicted to exceed EPA's major source thresholds in several counties. For the 100 million ton per year option,NO_X, VOCs, CO, PM and SO_2 emissions are expected to exceed the major source thresholds in several counties. Therefore, SEA reviewed the results of the CALPUFF air dispersion modeling performed as part of the air quality and visibility analysis for the new Extension Alternatives to determine if the impacts from the increased rail traffic would be expected to exceed the National Ambient Air Quality Standards (NAAQS) or Prevention of Significant Deterioration (PSD) Class II increments.[8]

[8] HC is a photo reactive pollutant which could form Ozone. In lieu of modeling, the HC impacts were estimated using the Chaffee methodology (see Appendix E).

The NAAQS are an air quality standard established by EPA for the protection of human health and welfare. They provide the maximum allowable concentrations for a pollutant in a particular county, and take into consideration emissions inside and outside the county that could affect the county. The NAAQS air concentrations for the various pollutants are:

· NOx -100 microgram/cubic meter (annual average),
· CO - 40,000 micrograms/cubic meter (1 hour average),
· CO - 10,000 micrograms/cubic meter (8 hour average),
· PM_{10} -50 microgram/cubic meter (annual average),
· PM_{10} -150 micrograms/cubic meter (24 hour average)
· SO_2 - 80 microgram/cubic meter (annual average),
· SO_2 - 365 micrograms/cubic meter (24 hour average),
· SO_2 - 1,300 micrograms/cubic meter (3 hour average - secondary standard).

PSD Class II increments are established by the EPA. They are the amount emissions of a particular pollutant can be increased above the existing emission level for that pollutant in a particular county. However, they do not enable emissions for a particular pollutant to exceed the NAAQS standards. For example, the NAAQS for NO_X is 100 microgram/cubic meter. If the existing NO_X level is 25 microgram/cubic meter, a new emissions source would have 75 microgram/cubic meter of emissions before it would reach the NAAQS level. However, PSD Class II increments would only allow the emissions to increase by 25 micrograms/cubic meters. Should the existing emissions be 80 micrograms/cubic meters for NO_X, while PSD Class II increments would allow it to be increased by 25 micrograms/cubic meters, NAAQS standards would only allow an increase of 20 micrograms/cubic metesrs. PSD Class II standards have been identified for NO_X, SO_2, and PM_{10} and are:

· NO_x - 25 micrograms/cubic meter (annual average),
· SO_2 - 20 micrograms/cubic meter (annual average),
· SO_2 - 91 micrograms/cubic meter (24 hour average),
· SO_2 - 512 micrograms/cubic meter (3 hour average),
· PM_{10} - 17 micrograms/cubic meter (annual average),
· PM_{10} - 30 micrograms/cubic meter (24 hour average).

SEA modeled air emissions using the CALPUFF model to obtain locomotive emission concentrations near the rail line. Locomotive emissions along the rail line ("near-field") would represent the maximum anticipated concentrations of the various pollutants because they would not have been diluted by wind or other atmospheric conditions. SEA then compared the concentrations obtained from the model for those pollutants that exceeded the major source thresholds to the NAAQS and PSD Class II increments. SEA performed this analysis to determine if the emissions increases along the existing rail line could cause or contribute to a violation of the NAAQS standards or PSD Class II increments. SEA's analysis showed that maximum projected ambient concentrations would be significantly lower than the NAAQS standards and PSD Class II increments. The modeling methodology and results are included in Appendix E (reference *Attachment 1: CALPUFF Technical Support Document*).

As trains pass through highway/rail grade intersections, automobiles and other on-road vehicles are required to stop and hold short of the intersection on either side of the crossing. While these vehicles are delayed, their engines are typically idling until the train passes. If a significant number of vehicles idle for a sufficient length of time, it is possible that concentrations of CO could be elevated in the vicinity of the crossing.

As part of the environmental analysis, delay times at highway/rail crossings were reviewed to determine numbers of vehicles that could potentially be queued (lines up) at any given time waiting to cross the rail line and the average vehicle delay that would be experienced by these vehicles. Vehicle queues and average delay times experienced under the pre-construction condition were compared with projected vehicle queues and average delay times for the post-construction condition. The results of this analysis show that the number of vehicles that would be queued at any given time, and the average delay time experienced by each of these vehicles, would decrease due to increased train speeds. The average number of vehicles queued at any given time before construction ranges from 12.5 to 44.7 vehicles, while the number of vehicles queued at any given time after construction ranges from 6.3 to 25.6. Similarly, the average pre-construction delay time per vehicle ranges from 1.6 to 2.4 seconds per vehicle, while the average post-construction delay time per vehicle is approximately 1.5 seconds. This results in a reduction, depending on the intersection, of 0.1 to 0.9 seconds per vehicle. Section 4.3.12 presents the data for the vehicle delays at public highway/grade crossings.

Although more trains would pass through the intersections on a daily basis, each train would spend a shorter period of time crossing each intersection due to its increased speed. Therefore, fewer cars would be queued at any given time. Additionally, the average delay time for each of these queued vehicles would be shorter since the trains would pass through the intersections in a shorter period of time than in the pre-construction scenario. As such, emissions from idling vehicles would occur on a more frequent basis but would have less chance of accumulating in the vicinity of the crossing due to the reduced time vehicles would be stopped at the crossing. It is therefore concluded that the potential for increased concentrations of CO in the vicinity of the rail crossings once reconstruction is complete would be minimal.

4.3.9 NOISE and VIBRATION

4.3.9.1 Noise

The reconstruction and operation of the proposed project would result in increased noise levels along the existing rail line. During reconstruction, portions of the rail line would be taken out of service for short periods, ranging from several hours to a few days. During this time, rail traffic and the associated noise from operating locomotives and trains would cease. Temporary noise would be generated from operation of vehicles and heavy equipment used for clearing, rail, tie, and ballast removal, and any rail bed work. These impacts would occur only during the short period required to reconstruct the existing rail line in a particular area. As reconstruction is estimated to occur a the rate of approximately one mile per day, most areas would likely experience increased noise from reconstruction activities for only a day or two. However, in those few scattered areas where the rail bed may require rehabilitation, earthmoving and excavation activities could result in reconstruction taking several days. Once a particular section of rail line is reconstructed, another section of rail line would be taken out of service and reconstruction activities relocated to the new area. Therefore, reconstruction noise would be moved along the rail line, with only short periods of increased noise occurring at a particular location. Normally, construction would occur in two shifts, from 6 a.m. to 11 p.m., with equipment maintenance, some of which may occur to equipment within the right-of-way, occurring between 11 p.m. and 6 a.m.

DM&E would continue to operate a fully functioning rail line during the reconstruction period. Therefore, breaks in reconstruction could occur to allow movement of trains. In addition, where siding would not be constructed, reconstruction could be suspended for short periods to allow train movement. These sections of rail line would experience near normal levels of rail traffic noise. However, on days when reconstruction activities would be occurring, only construction related noise would be experienced by noise sensitive receptors.

In areas where siding would be constructed along the existing rail line, construction of siding would occur adjacent to the rail line without the rail line being taken out of service, allowing trains to continue to operate. Areas adjacent to these sections of rail line would be exposed to increased noise due to both rail operations and reconstruction occurring simultaneously. Following completion of siding construction, trains could operate over the siding, allowing reconstruction of the rail line. Noise in these areas would be generated by both construction activities and existing levels of train traffic for the duration of the reconstruction period estimated by DM&E to be approximately one day per mile of rail line.

Following reconstruction, operation of the existing DM&E rail line would result in an increase in rail traffic over the rebuilt portion of the existing DM&E system. At the level of rail traffic anticipated during the initial operation of the project (20 MNT, which would be equal to 8 trains per day, 4 loaded and 4 empty), SEA determined that the entire existing system would meet the Board's environmental analysis thresholds for noise at 49 CFR 1105.7(e)(6). The Board's thresholds for noise analysis are:

- all rail lines where rail traffic would increase by eight or more trains per day, or
- all rail lines for which the gross ton-miles transported annually increases by 100 percent or more.

As the levels of traffic increase, these thresholds would continue to be exceeded. Therefore, SEA conducted a detailed evaluation of potential noise impacts from operation of the proposed project. Based on information provided in DM&E's Application to the Board indicating a monetary break-even level of rail traffic equal to 8 coal trains per day increasing over time to as many as 34 coal trains per day, SEA determined a detailed analysis of noise impacts was appropriate for the existing rail line.

SEA performed an analysis of the entire length of the existing DM&E rail line in South Dakota to determine the potential noise impacts of the proposed increases in rail traffic. SEA calculated the distance (contour) at which the average daily noise level (L_{dn}) would be equal to 65 decibels (dB) on an A-weighted scale (A),[9] or would experience an increase of 3 dBA L_{dn} or greater, as specified in the Board's rules. Distances less than the 65 dBA L_{dn} contour would experience average daily noise levels greater than 65 dBA. Federal agencies, including the Federal Aviation Administration and Department of Housing and Urban Development, consider noise levels up to 65 dBA L_{dn} to be compatible with most noise sensitive receptors. These agencies, as well as the Board, agree that noise levels at or above 65 dBA L_{dn} are adverse. Figure 4-1 provides a comparison of common noise levels with rail wayside and horn noise. SEA also calculated the 70 dBA L_{dn} contour. The 70 dBA L_{dn} noise level was established by SEA in the Conrail Acquisition, Finance Docket No. 33388, as the noise level at which mitigation for noise impacts would be considered for that case. It is applied here as a comparison to the number of noise sensitive receptors calculated to experience noise levels of 65 dBA L_{dn} or greater. Additionally, SEA considers noise levels at and above 70 dBA L_{dn} to be significantly adverse.

[9] A-weighted scale considers only those frequencies of noise that are audible to the human ear.

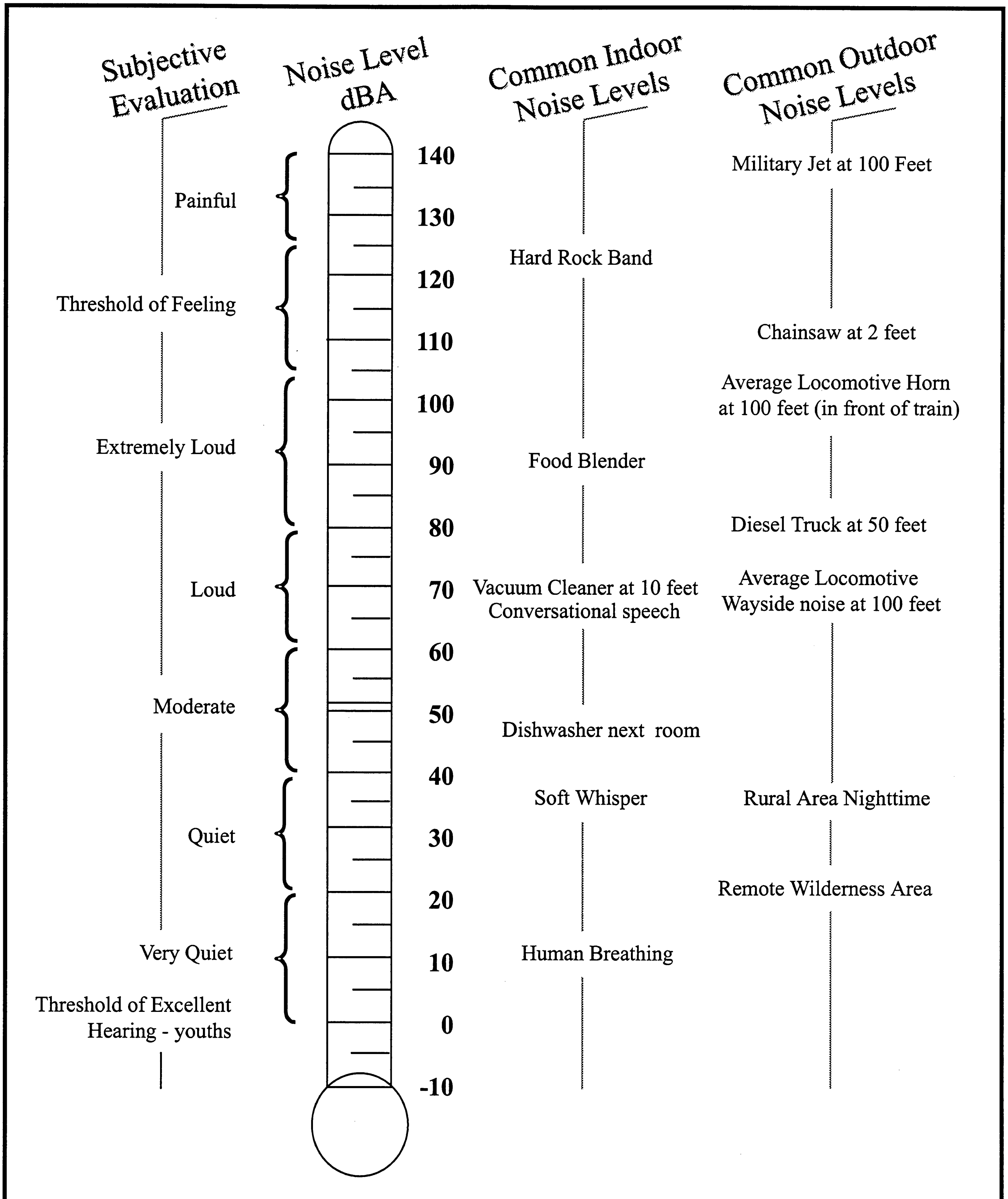

Figure 4-1
POWDER RIVER BASIN EXPANSION PROJECT
SAMPLE NOISE LEVELS

Noise contours were calculated for both the existing and proposed operating conditions, at proposed annual coal transportation levels of 20 MNT, 50 MNT, and 100 MNT. These levels of operation were selected by SEA because the exact levels of train traffic are dependent upon DM&E securing contracts for coal transportation. The 20 MNT level is roughly the break-even level for the project and therefore represents the minimum level of rail traffic. DM&E projected in its Application to the Board a level equivalent to 50 MNT shortly after beginning operation, potentially expanding to 100 MNT within 7 years. As 50 MNT appears to be a reasonably foreseeable level of operation and 100 MNT was indicated by DM&E as the maximum level its system could accommodate, these levels of operation were also evaluated. Additionally, DM&E indicated it would have approximately 3 trains per day due to its existing rail traffic. Contours were calculated for 11 (20 MNT), 21 (50 MNT), and 37 (100 MNT) trains per day, of which 3 would be existing rail traffic and the remaining would be unit coal trains. SEA counted noise sensitive receptors (e.g. schools, hospitals, churches, and residences) within the noise contours for the current condition and under each of the proposed annual operating scenarios.

Operational noise sources include the diesel locomotive engine, wheel/rail interaction noise (or wayside noise), and horn noise. Wayside noise affects all locations in the vicinity of the rail facility. Horn noise is an additional noise source at grade crossings where trains are required by law to sound a horn for safety. Both types of noise diminish with distance.

The area along the DM&E rail line and affected communities that would experience increases in traffic or activity meeting the Board's environmental analysis threshold for South Dakota are listed in Tables 4.3-5 through 4.3-17. Tables 4.3-5 through 4.3-8 show the communities, within their respective counties, with the number of noise sensitive receptors expected to experience noise levels exceeding 65 dBA L_{dn}. County totals are in bold and include both the sensitive receptors within and outside the communities. Noise sensitive receptors within this noise level due to wayside noise, wayside and horn noise, and horn noise only are presented. Tables 4.3-9 through 4.3-12 show the communities, within their respective counties, with the number of noise sensitive receptors exceeding 70 dBA L_{dn}. A comparison of the existing conditions at both the 65 dBA and 70 dBA is shown in Tables 4.3-13 through 4.3-18. Negative numbers reflect a reduction in the number of noise sensitive receptors within a given noise impact category. These reductions only occur for the horn noise category. Where these reductions occur, they are due to some noise sensitive receptors in the existing condition that are within a noise contour (either 65 or 70 dBA L_{dn}) due to horn noise being within a contour for either wayside or wayside and horn noise under a future operating scenario. Generally, noise sensitive receptor density along the rail line in South Dakota is such that SEA found the existing condition accounted for many of the noise sensitive receptors affected by the project. That is, many of the noise sensitive receptors anticipated to experience adverse noise levels due to this project currently are exposed to such noise levels due to horn sounding. Increasing the level of train traffic did increased the number of receptors, as well as changed the category in which many were counted. In some instances, such as for Wendte in Stanley County (Table 4.3-15), the entire community was affected by horn noise. Increased rail noise levels did not result in any additional noise sensitive receptors being affected, however it changed the category of noise to which they were exposed.

Missouri River Bridge Impacts

Six residences are located within 500 feet of the existing DM&E railroad bridge. Noise disturbance during rehabilitation of the existing bridge would occur during reconstruction. New bridge construction would result in a greater increase in noise exposure due to the increase in construction activity and increased amount of construction equipment required. Rehabilitation or construction would last for a period of approximately 2 to 3 years. The potential removal of the existing bridge, following the potential construction of a new bridge, would extend noise disturbance for a period necessary for bridge removal. During operation, noise sensitive receptors would be exposed to a greater level of noise. However, the number of noise sensitive receptors affected by the rehabilitation of the existing bridge would be similar to that for new bridge construction due to the minimal change in distance (34 feet) from the existing bridge location.

Table 4.3-5
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**6**	**179**	**185**
Elkton	0	0	71	71
Aurora	0	6	109	115
Arlington	0	0	1	1
Kingsbury	**0**	**0**	**395**	**395**
Arlington	0	0	93	93
Hetland	0	0	23	23
Lake Preston	0	0	94	94
De Smet	0	0	138	138
Manchester	0	0	17	17
Iroquois	0	0	19	20

Table 4.3-5
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Beadle	**0**	**1**	**229**	**230**
Iroquois	0	0	20	20
Cavour	0	0	20	20
Morningside	0	0	0	0
Huron	0	1	112	113
Wolsey	0	0	38	38
Wessington	0	0	29	29
Hand	**0**	**3**	**105**	**108**
Wessington	0	0	1	1
Vayland	0	0	4	4
St. Lawrence	0	1	15	16
Miller	0	2	73	75
Ree Heights	0	0	9	9
Hyde	**0**	**0**	**26**	**26**
Highmore	0	0	24	24
Holabird	0	0	0	0
Hughes	**0**	**0**	**308**	**308**
Harrold	0	0	26	26
Blunt	0	0	15	15
Canning	0	0	7	7
Alto	0	0	0	0
Pierre	0	0	258	258
Stanley	**0**	**0**	**183**	**183**
Ft. Pierre	0	0	177	177
Wendte	0	0	2	2
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
Haakon	**0**	**0**	**53**	**53**
Midland	0	0	25	25
Nowlin	0	0	0	0
Powell	0	0	0	0
Philip	0	0	28	28

Table 4.3-5
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Jackson	**0**	**1**	**3**	**4**
Cottonwood	0	1	3	4
Pennington (Wall east only)	**0**	**3**	**20**	**23**
Quinn	0	0	8	8
Wall	0	1	12	13

Table 4.3-6
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**2**	**27**	**215**	**244**
Elkton	0	2	83	85
Aurora	2	24	117	143
Arlington	0	1	1	2
Kingsbury	**0**	**36**	**612**	**648**
Arlington	0	2	142	144
Hetland	0	0	34	34
Lake Preston	0	8	123	131
De Smet	0	27	251	278
Manchester	0	0	17	17
Iroquois	0	0	45	45
Beadle	**0**	**17**	**450**	**467**
Iroquois	0	0	25	25
Cavour	0	0	42	42
Morningside	0	0	0	0
Huron	0	7	213	220
Wolsey	0	2	75	77
Wessington	0	7	75	82

Table 4.3-6
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Hand	**0**	**21**	**278**	**299**
Wessington	0	0	3	3
Vayland	0	0	9	9
St. Lawrence	0	2	62	64
Miller	0	19	178	197
Ree Heights	0	0	21	21
Hyde	**0**	**0**	**113**	**113**
Highmore	0	0	109	109
Holabird	0	0	2	2
Hughes	**8**	**37**	**781**	**826**
Harrold	0	1	50	51
Blunt	2	0	34	36
Canning	0	0	9	9
Alto	0	0	0	0
Pierre	6	36	684	726
Stanley	**3**	**33**	**253**	**289**
Ft. Pierre	3	33	246	282
Wendte	0	0	2	2
Jones	**2**	**0**	**0**	**2**
Capa	2	0	0	2
Haakon	**10**	**17**	**177**	**204**
Midland	0	4	51	55
Nowlin	1	0	1	1
Powell	0	0	3	3
Philip	6	13	117	136
Jackson	**0**	**2**	**10**	**12**
Cottonwood	0	2	10	12
Pennington (Wall east only)	**0**	**3**	**110**	**113**
Quinn	0	0	22	22
Wall	0	3	88	91

Table 4.3-7
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**2**	**47**	**278**	**327**
Elkton	0	10	122	132
Aurora	2	34	139	175
Arlington	0	1	1	2
Kingsbury	**2**	**113**	**750**	**865**
Arlington	0	17	208	225
Hetland	0	5	30	35
Lake Preston	0	22	149	171
De Smet	0	57	317	374
Manchester	0	9	9	18
Iroquois	0	3	26	29
Beadle	**0**	**31**	**818**	**849**
Iroquois	0	1	84	85
Cavour	0	2	65	67
Morningside	0	0	0	0
Huron	0	10	426	436
Wolsey	0	4	121	125
Wessington	0	12	100	112
Hand	**2**	**47**	**422**	**471**
Wessington	0	0	6	6
Vayland	0	1	9	10
St. Lawrence	0	9	92	101
Miller	1	35	264	300
Ree Heights	0	2	35	37
Hyde	**0**	**9**	**196**	**205**
Highmore	0	8	185	193
Holabird	0	0	8	8

Table 4.3-7
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	**Wayside/horn**	**Horn**	**Total**
Hughes	**15**	**92**	**1,321**	**1,428**
Harrold	0	5	62	67
Blunt	2	0	66	68
Canning	1	0	9	10
Alto	0	0	0	0
Pierre	9	85	1,178	1,272
Stanley	**6**	**51**	**444**	**501**
Ft. Pierre	3	50	433	486
Wendte	0	1	1	2
Jones	**2**	**0**	**0**	**2**
Capa	2	0	0	2
Haakon	**12**	**37**	**325**	**374**
Midland	0	15	74	89
Nowlin	0	2	4	6
Powell	0	1	2	3
Philip	6	19	246	271
Jackson	**0**	**4**	**15**	**19**
Cottonwood	0	4	14	18
Pennington (Wall east only)	**0**	**24**	**229**	**253**
Quinn	0	3	35	38
Wall	0	4	151	155

Table 4.3-8
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**6**	**73**	**307**	**386**
Elkton	0	22	159	181
Aurora	4	47	125	176
Arlington	0	1	3	4
Kingsbury	**3**	**171**	**971**	**1,145**
Arlington	0	41	256	297
Hetland	0	10	25	35
Lake Preston	0	39	206	245
De Smet	0	63	347	410
Manchester	0	13	5	18
Iroquois	0	5	24	29
Beadle	**0**	**94**	**1,228**	**1,322**
Iroquois	0	7	101	108
Cavour	0	11	56	67
Morningside	0	0	1	1
Huron	0	32	850	882
Wolsey	0	11	138	149
Wessington	0	26	86	112
Hand	**2**	**86**	**543**	**631**
Wessington	0	0	12	12
Vayland	0	4	6	10
St. Lawrence	0	17	91	108
Miller	1	59	371	431
Ree Heights	0	4	44	48

Table 4.3-8
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Hyde	**3**	**11**	**290**	**304**
Highmore	0	11	274	285
Holabird	0	0	11	11
Hughes	**49**	**202**	**1,764**	**2,015**
Harrold	0	10	60	70
Blunt	2	4	128	134
Canning	1	4	7	12
Alto	0	0	0	0
Pierre	16	180	1,563	1,759
Stanley	**10**	**110**	**483**	**603**
Ft. Pierre	4	106	471	581
Wendte	0	1	1	2
Jones	**2**	**0**	**0**	**2**
Capa	1	0	0	1
Haakon	**15**	**59**	**381**	**455**
Midland	0	18	77	95
Nowlin	0	4	4	8
Powell	0	1	2	3
Philip	7	36	298	341
Jackson	**0**	**4**	**18**	**22**
Cottonwood	0	4	14	18
Pennington (Wall east only)	**1**	**52**	**307**	**360**
Quinn	1	13	24	38
Wall	0	16	245	261

Table 4.3-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**2**	**73**	**75**
Elkton	0	0	26	26
Aurora	0	2	43	45
Arlington	0	0	1	1
Kingsbury	**0**	**0**	**124**	**124**
Arlington	0	0	17	17
Hetland	0	0	6	6
Lake Preston	0	0	31	31
De Smet	0	0	54	54
Manchester	0	0	10	10
Iroquois	0	0	6	6
Beadle	**0**	**1**	**37**	**38**
Iroquois	0	0	3	3
Cavour	0	0	3	3
Morningside	0	0	0	0
Huron	0	1	16	17
Wolsey	0	0	10	10
Wessington	0	0	3	3
Hand	**0**	**0**	**35**	**35**
Wessington	0	0	5	5
Vayland	0	0	1	1
St. Lawrence	0	0	1	1
Miller	0	0	27	27
Ree Heights	0	0	0	0
Hyde	**0**	**0**	**7**	**7**
Highmore	0	0	6	6
Holabird	0	0	0	0
Hughes	**0**	**0**	**155**	**155**
Harrold	0	0	3	3
Blunt	0	0	3	3
Canning	0	0	0	0
Alto	0	0	0	0
Pierre	0	0	148	148

Table 4.3-9
Existing Rail Line - South Dakota
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Communities	Wayside	Wayside/horn	Horn	Total
Stanley	**0**	**0**	**57**	**57**
Ft. Pierre	0	0	56	56
Wendte	0	0	1	1
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
Haakon	**0**	**0**	**24**	**24**
Midland	0	0	12	12
Nowlin	0	0	0	0
Powell	0	0	0	0
Philip	0	0	12	12
Jackson	**0**	**0**	**1**	**1**
Cottonwood	0	0	1	1
Pennington (Wall east only)	**0**	**0**	**8**	**8**
Quinn	0	0	0	0
Wall	0	0	8	8

Table 4.3-10
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**3**	**87**	**90**
Elkton	0	0	34	34
Aurora	0	3	45	48
Arlington	0	0	2	2

Table 4.3-10
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Kingsbury	**0**	**0**	**209**	**209**
Arlington	0	0	53	53
Hetland	0	0	14	14
Lake Preston	0	0	58	58
De Smet	0	0	79	79
Manchester	0	0	14	14
Iroquois	0	0	13	13
Beadle	**0**	**1**	**116**	**117**
Iroquois	0	0	8	8
Cavour	0	0	14	14
Morningside	0	0	0	0
Huron	0	1	49	50
Wolsey	0	0	15	15
Wessington	0	0	24	24
Hand	**0**	**2**	**129**	**131**
Wessington	0	0	5	5
Vayland	0	0	4	4
St. Lawrence	0	0	26	26
Miller	0	2	87	89
Ree Heights	0	0	7	7
Hyde	**0**	**0**	**27**	**27**
Highmore	0	0	25	25
Holabird	0	0	1	1
Hughes	**0**	**0**	**279**	**279**
Harrold	0	0	28	28
Blunt	0	0	5	5
Canning	0	0	0	0
Alto	0	0	0	0
Pierre	0	0	241	241
Stanley	**0**	**6**	**77**	**83**
Ft. Pierre	0	6	70	76
Wendte	0	0	4	4

Table 4.3-10
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Communities	Number of Noise Sensitive Receptors for 11 Trains			
	Wayside	Wayside/horn	Horn	Total
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0
Haakon	**0**	**0**	**78**	**78**
Midland	0	0	24	24
Nowlin	0	0	1	1
Powell	0	0	0	0
Philip	0	0	53	53
Jackson	**0**	**0**	**3**	**3**
Cottonwood	0	0	3	3
Pennington (Wall east only)	**0**	**0**	**58**	**58**
Quinn	0	0	15	15
Wall	0	0	43	43

Table 4.3-11
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**7**	**146**	**153**
Elkton	0	0	64	64
Aurora	0	7	73	80
Arlington	0	0	2	2
Kingsbury	**0**	**16**	**412**	**428**
Arlington	0	1	76	77
Hetland	0	0	28	28
Lake Preston	0	1	101	102
De Smet	0	14	143	157
Manchester	0	0	26	26
Iroquois	0	0	20	20

Table 4.3-11
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Beadle	**0**	**5**	**251**	**256**
Iroquois	0	0	15	15
Cavour	0	0	34	34
Morningside	0	0	0	0
Huron	0	3	151	154
Wolsey	0	1	48	49
Wessington	0	1	54	55
Hand	**0**	**8**	**282**	**290**
Wessington	0	0	9	9
Vayland	0	0	8	8
St. Lawrence	0	0	48	48
Miller	0	6	129	135
Ree Heights	0	0	17	17
Hyde	**0**	**0**	**64**	**64**
Highmore	0	0	62	62
Holabird	0	0	1	1
Hughes	**0**	**15**	**591**	**606**
Harrold	0	1	40	41
Blunt	0	1	13	14
Canning	0	0	0	0
Alto	0	0	0	0
Pierre	0	13	530	543
Stanley	**4**	**9**	**182**	**195**
Ft. Pierre	3	9	176	188
Wendte	0	0	5	5
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0

Table 4.3-11
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Communities	Number of Noise Sensitive Receptors for 21 Trains			
	Wayside	Wayside/horn	Horn	Total
Haakon	**2**	**15**	**148**	**165**
Midland	0	4	37	41
Nowlin	0	0	4	4
Powell	0	0	0	0
Philip	0	11	102	113
Jackson	**0**	**1**	**4**	**5**
Cottonwood	0	1	4	5
Pennington (Wall east only)	**0**	**6**	**111**	**117**
Quinn	0	0	30	30
Wall	0	6	81	87

Table 4.3-12
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Brookings	**0**	**22**	**171**	**193**
Elkton	0	0	74	74
Aurora	0	20	81	101
Arlington	0	1	1	2
Kingsbury	**0**	**43**	**625**	**668**
Arlington	0	1	102	103
Hetland	0	0	33	33
Lake Preston	0	8	131	139
De Smet	0	32	285	317
Manchester	0	2	14	16
Iroquois	0	0	60	60

Table 4.3-12
Existing Rail Line - South Dakota
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Beadle	**0**	**13**	**514**	**527**
Iroquois	0	1	25	26
Cavour	0	0	52	52
Morningside	0	0	0	0
Huron	0	6	262	268
Wolsey	0	2	88	90
Wessington	0	3	81	84
Hand	**0**	**27**	**319**	**346**
Wessington	0	0	9	9
Vayland	0	0	8	8
St. Lawrence	0	2	74	76
Miller	0	25	193	218
Ree Heights	0	0	22	22
Hyde	**1**	**0**	**125**	**126**
Highmore	0	0	123	123
Holabird	0	0	2	2
Hughes	**7**	**39**	**1,565**	**1,611**
Harrold	0	1	58	59
Blunt	1	1	36	38
Canning	0	0	9	9
Alto	0	0	0	0
Pierre	5	37	1,462	1,504
Stanley	**4**	**19**	**324**	**347**
Ft. Pierre	3	17	314	334
Wendte	0	2	4	6
Jones	**0**	**0**	**0**	**0**
Capa	0	0	0	0

Table 4.3-12 Existing Rail Line - South Dakota Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT				
County and Communities	Number of Noise Sensitive Receptors for 37 Trains			
	Wayside	Wayside/horn	Horn	Total
Haakon	**8**	**20**	**172**	**200**
Midland	0	6	46	52
Nowlin	0	0	5	5
Powell	0	0	0	0
Philip	6	14	120	140
Jackson	**0**	**2**	**10**	**12**
Cottonwood	0	2	10	12
Pennington (Wall east only)	**0**	**3**	**120**	**123**
Quinn	0	0	30	30
Wall	0	3	90	93

Table 4.3-13 Existing Rail Line - South Dakota Noise Sensitive Receptor Comparison Existing and Proposed Conditions at 20 MNT - 65 dBA L_{dn}									
County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**2**	**2**	**0**	**27**	**27**	**179**	**215**	**36**
Elkton	0	0	0	0	2	2	71	83	11
Aurora	0	2	2	6	24	18	109	117	8
Arlington	0	0	0	0	1	1	1	1	0
Kingsbury	**0**	**0**	**0**	**0**	**36**	**36**	**395**	**612**	**217**
Arlington	0	0	0	0	2	2	93	142	49
Hetland	0	0	0	0	0	0	23	34	11
Lake Preston	0	0	0	0	8	8	94	123	29
De Smet	0	0	0	0	27	27	138	251	113
Manchester	0	0	0	0	0	0	17	17	0
Iroquois	0	0	0	0	0	0	19	45	26

Table 4.3-13
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 65 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Beadle	**0**	**0**	**0**	**1**	**17**	**16**	**229**	**450**	**221**
Iroquois	0	0	0	0	0	0	22	25	3
Cavour	0	0	0	0	0	0	20	42	22
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	7	6	112	213	101
Wolsey	0	0	0	0	2	2	38	75	37
Wessington	0	0	0	0	7	7	29	75	46
Hand	**0**	**0**	**0**	**3**	**21**	**18**	**105**	**278**	**173**
Wessington	0	0	0	0	0	0	1	3	2
Vayland	0	0	0	0	0	0	4	9	5
St. Lawrence	0	0	0	1	2	1	15	62	47
Miller	0	0	0	2	19	17	73	178	105
Ree Heights	0	0	0	0	0	0	9	21	12
Hyde	**0**	**0**	**0**	**0**	**0**	**0**	**26**	**113**	**87**
Highmore	0	0	0	0	0	0	24	109	85
Holabird	0	0	0	0	0	0	0	2	2
Hughes	**0**	**8**	**8**	**0**	**37**	**37**	**308**	**781**	**473**
Harrold	0	0	0	0	1	1	26	50	24
Blunt	0	2	2	0	0	0	15	34	19
Canning	0	0	0	0	0	0	7	9	2
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	6	6	0	36	36	258	684	426
Stanley	**0**	**3**	**3**	**0**	**33**	**33**	**183**	**253**	**70**
Ft. Pierre	0	3	3	0	33	33	177	246	69
Wendte	0	0	0	0	0	0	2	2	0
Jones	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	2	2	0	0	0	0	0	0

Table 4.3-13
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 65 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Haakon	**0**	**10**	**10**	**0**	**17**	**17**	**53**	**177**	**124**
Midland	0	0	0	0	4	4	25	51	26
Nowlin	0	1	1	0	0	0	0	1	1
Powell	0	0	0	0	0	0	0	3	0
Philip	0	6	6	0	13	13	28	117	89
Jackson	**0**	**0**	**0**	**1**	**2**	**1**	**3**	**10**	**7**
Cottonwood	0	0	0	1	2	1	3	10	7
Pennington	**0**	**0**	**0**	**3**	**3**	**0**	**20**	**110**	**90**
Quinn	0	0	0	0	0	0	8	22	14
Wall	0	0	0	1	3	2	12	88	76

[1] - E=existing P=proposed I=increase

Table 4.3-14
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 65 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E[1]	P[1]	I[1]	E	P	I	E	P	I
Brookings	**0**	**2**	**2**	**6**	**47**	**41**	**179**	**278**	**99**
Elkton	0	0	0	0	10	10	71	122	51
Aurora	0	2	2	6	34	28	109	139	30
Arlington	0	0	0	0	1	1	1	1	0
Kingsbury	**0**	**2**	**2**	**0**	**113**	**113**	**395**	**750**	**355**
Arlington	0	0	0	0	17	17	93	208	115
Hetland	0	0	0	0	5	5	23	30	7
Lake Preston	0	0	0	0	22	22	94	149	55
De Smet	0	0	0	0	57	57	138	317	179
Manchester	0	0	0	0	9	9	17	9	8
Iroquois	0	0	0	0	3	3	19	26	7
Beadle	**0**	**0**	**0**	**1**	**31**	**30**	**229**	**818**	**589**
Iroquois	0	0	0	0	1	1	22	84	62
Cavour	0	0	0	0	2	2	20	65	45
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	10	9	112	426	314
Wolsey	0	0	0	0	4	4	38	121	83
Wessington	0	0	0	0	12	12	29	100	71
Hand	**0**	**2**	**2**	**3**	**47**	**44**	**105**	**422**	**317**
Wessington	0	0	0	0	0	0	1	6	5
Vayland	0	0	0	0	1	1	4	9	5
St. Lawrence	0	0	0	1	9	8	15	92	77
Miller	0	1	1	2	35	33	73	264	191
Ree Heights	0	0	0	0	2	2	9	35	26
Hyde	**0**	**0**	**0**	**0**	**9**	**9**	**26**	**196**	**170**
Highmore	0	0	0	0	8	8	24	185	161
Holabird	0	0	0	0	0	0	0	8	8

Table 4.3-14
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 65 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**15**	**15**	**0**	**92**	**92**	**308**	**1,321**	**1,013**
Harrold	0	0	0	0	5	5	26	62	36
Blunt	0	2	2	0	0	0	15	66	51
Canning	0	1	1	0	0	0	7	9	2
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	9	9	0	85	85	258	1,178	920
Stanley	**0**	**6**	**6**	**0**	**51**	**51**	**183**	**444**	**261**
Ft. Pierre	0	3	3	0	50	50	177	433	256
Wendte	0	0	0	0	1	1	2	1	-1
Jones	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	2	2	0	0	0	0	0	0
Haakon	**0**	**12**	**12**	**0**	**37**	**37**	**53**	**325**	**272**
Midland	0	0	0	0	15	15	25	74	49
Nowlin	0	0	0	0	2	2	0	4	4
Powell	0	0	0	0	1	1	0	2	2
Philip	0	6	6	0	19	19	28	246	218
Jackson	**0**	**0**	**0**	**1**	**4**	**3**	**3**	**15**	**12**
Cottonwood	0	0	0	1	4	3	3	14	11
Pennington	**0**	**0**	**0**	**3**	**24**	**21**	**20**	**229**	**209**
Quinn	0	0	0	0	3	3	8	35	27
Wall	0	0	0	1	4	3	12	151	139

[1] - E=existing P=proposed I=increase

Table 4.3-15
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison for Existing
Proposed Conditions at 100 MNT - 65 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**6**	**6**	**6**	**73**	**67**	**179**	**307**	**128**
Elkton	0	0	0	0	22	22	71	159	88
Aurora	0	4	4	6	47	41	109	125	16
Arlington	0	0	0	0	1	1	1	3	2
Kingsbury	**0**	**3**	**3**	**0**	**171**	**171**	**395**	**974**	**579**
Arlington	0	0	0	0	41	41	93	256	163
Hetland	0	0	0	0	10	10	23	25	2
Lake Preston	0	0	0	0	39	39	94	206	112
De Smet	0	0	0	0	63	63	138	347	209
Manchester	0	0	0	0	13	13	17	5	-12
Iroquois	0	0	0	0	5	5	19	24	5
Beadle	**0**	**0**	**0**	**1**	**94**	**93**	**229**	**1,228**	**999**
Iroquois	0	0	0	0	7	7	20	101	81
Cavour	0	0	0	0	11	11	20	56	36
Morningside	0	0	0	0	0	0	0	1	1
Huron	0	0	0	1	32	31	112	850	738
Wolsey	0	0	0	0	11	11	38	138	100
Wessington	0	0	0	0	26	26	29	86	57
Hand	**0**	**2**	**0**	**3**	**86**	**83**	**105**	**543**	**438**
Wessington	0	0	0	0	0	0	1	12	11
Vayland	0	0	0	0	4	4	4	6	2
St. Lawrence	0	0	0	1	17	16	15	91	76
Miller	0	1	0	2	59	57	73	371	298
Ree Heights	0	0	0	0	4	4	9	44	35
Hyde	**0**	**3**	**3**	**0**	**11**	**11**	**26**	**290**	**264**
Highmore	0	0	0	0	11	11	24	274	250
Holabird	0	0	0	0	0	0	0	11	11

Table 4.3-15
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison for Existing
Proposed Conditions at 100 MNT - 65 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**49**	**49**	**0**	**202**	**202**	**308**	**1,764**	**1,456**
Harrold	0	0	0	0	10	10	26	60	34
Blunt	0	2	2	0	4	4	15	128	113
Canning	0	1	1	0	4	4	7	7	0
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	16	16	0	180	180	258	1,563	1,305
Stanley	**0**	**10**	**10**	**0**	**110**	**110**	**183**	**483**	**300**
Ft. Pierre	0	4	4	0	106	106	177	471	294
Wendte	0	0	0	0	1	1	2	1	-1
Jones	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	1	1	0	0	0	0	0	0
Haakon	**0**	**15**	**15**	**0**	**59**	**59**	**53**	**381**	**328**
Midland	0	0	0	0	18	18	25	77	52
Nowlin	0	0	0	0	4	4	0	4	4
Powell	0	0	0	0	1	1	0	2	2
Philip	0	7	7	0	36	36	28	298	270
Jackson	**0**	**0**	**0**	**1**	**4**	**3**	**3**	**18**	**15**
Cottonwood	0	0	0	1	4	3	3	14	11
Pennington	**0**	**1**	**1**	**3**	**29**	**26**	**20**	**269**	**249**
Quinn	0	1	1	0	13	13	8	24	16
Wall	0	0	0	1	16	15	12	245	133

[1] - E=existing P=proposed I=increase

Table 4.3-16
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 70 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E[1]	P[1]	I[1]	E	P	I	E	P	I
Brookings	**0**	**0**	**0**	**2**	**3**	**1**	**73**	**87**	**14**
Elkton	0	0	0	0	0	0	26	34	8
Aurora	0	0	0	2	3	1	43	45	2
Arlington	0	0	0	0	0	0	1	2	1
Kingsbury	**0**	**0**	**0**	**0**	**0**	**0**	**124**	**209**	**85**
Arlington	0	0	0	0	0	0	17	53	36
Hetland	0	0	0	0	0	0	6	14	8
Lake Preston	0	0	0	0	0	0	31	58	27
De Smet	0	0	0	0	0	0	54	79	25
Manchester	0	0	0	0	0	0	10	14	4
Iroquois	0	0	0	0	0	0	6	13	7
Beadle	**0**	**0**	**0**	**1**	**1**	**0**	**37**	**116**	**79**
Iroquois	0	0	0	0	0	0	3	8	5
Cavour	0	0	0	0	0	0	3	14	11
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	1	0	16	49	33
Wolsey	0	0	0	0	0	0	10	15	5
Wessington	0	0	0	0	0	0	3	24	21
Hand	**0**	**0**	**0**	**0**	**2**	**2**	**35**	**129**	**98**
Wessington	0	0	0	0	0	0	5	5	0
Vayland	0	0	0	0	0	0	1	4	3
St. Lawrence	0	0	0	0	0	0	1	26	25
Miller	0	0	0	0	2	2	27	87	60
Ree Heights	0	0	0	0	0	0	0	7	7
Hyde	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**27**	**20**
Highmore	0	0	0	0	0	0	6	25	19
Holabird	0	0	0	0	0	0	0	1	1

Table 4.3-16
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 70 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**0**	**0**	**0**	**0**	**0**	**155**	**279**	**124**
Harrold	0	0	0	0	0	0	3	28	25
Blunt	0	0	0	0	0	0	3	5	2
Canning	0	0	0	0	0	0	0	0	0
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	0	0	0	0	0	148	241	93
Stanley	**0**	**0**	**0**	**0**	**6**	**6**	**57**	**77**	**20**
Ft. Pierre	0	0	0	0	6	6	56	70	14
Wendte	0	0	0	0	0	0	1	4	3
Jones	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	0	0	0	0	0	0	0	0
Haakon	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**78**	**54**
Midland	0	0	0	0	0	0	12	24	12
Nowlin	0	0	0	0	0	0	0	1	1
Powell	0	0	0	0	0	0	0	0	0
Philip	0	0	0	0	0	0	12	53	41
Jackson	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**2**
Cottonwood	0	0	0	0	0	0	1	3	2
Pennington	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**58**	**50**
Quinn	0	0	0	0	0	0	0	15	15
Wall	0	0	0	0	0	0	8	43	35

[1] - E=existing P=proposed I=increase

Table 4.3-17
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 70 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**0**	**0**	**2**	**7**	**5**	**73**	**146**	**73**
Elkton	0	0	0	0	0	0	26	64	38
Aurora	0	0	0	2	7	5	43	73	30
Arlington	0	0	0	0	0	0	1	2	1
Kingsbury	**0**	**0**	**0**	**0**	**16**	**16**	**124**	**412**	**288**
Arlington	0	0	0	0	1	1	17	76	59
Hetland	0	0	0	0	0	0	6	28	22
Lake Preston	0	0	0	0	1	1	31	101	70
De Smet	0	0	0	0	14	14	54	143	89
Manchester	0	0	0	0	0	0	10	26	16
Iroquois	0	0	0	0	0	0	6	20	14
Beadle	**0**	**0**	**0**	**1**	**5**	**4**	**37**	**251**	**214**
Iroquois	0	0	0	0	0	0	3	15	12
Cavour	0	0	0	0	0	0	3	34	31
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	3	2	16	151	135
Wolsey	0	0	0	0	1	1	10	48	38
Wessington	0	0	0	0	1	1	3	54	51
Hand	**0**	**0**	**0**	**0**	**8**	**8**	**35**	**282**	**317**
Wessington	0	0	0	0	0	0	5	9	4
Vayland	0	0	0	0	0	0	1	8	7
St. Lawrence	0	0	0	0	0	0	1	48	47
Miller	0	0	0	0	6	6	27	129	102
Ree Heights	0	0	0	0	0	0	0	17	17
Hyde	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**64**	**57**
Highmore	0	0	0	0	0	0	6	62	56
Holabird	0	0	0	0	0	0	0	1	1

Table 4.3-17
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 70 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E[1]	P[1]	I[1]	E	P	I	E	P	I
Hughes	**0**	**0**	**0**	**0**	**15**	**15**	**155**	**591**	**436**
Harrold	0	0	0	0	1	1	3	40	37
Blunt	0	0	0	0	1	1	3	13	10
Canning	0	0	0	0	0	0	0	0	0
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	0	0	0	13	13	148	530	383
Stanley	**0**	**4**	**4**	**0**	**9**	**9**	**57**	**182**	**125**
Ft. Pierre	0	3	3	0	9	9	56	176	120
Wendte	0	0	0	0	0	0	1	5	4
Jones	**0**	**0**	**0**	0	**0**	**0**	0	**0**	0
Capa	0	0	0	0	0	0	0	0	0
Haakon	**0**	**2**	**2**	**0**	**15**	**15**	**24**	**148**	**172**
Midland	0	0	0	0	4	4	12	37	25
Nowlin	0	0	0	0	0	0	0	4	4
Powell	0	0	0	0	0	0	0	0	0
Philip	0	0	0	0	11	11	12	102	90
Jackson	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**4**	**3**
Cottonwood	0	0	0	0	1	1	1	4	3
Pennington	**0**	**0**	**0**	**0**	**6**	**6**	**8**	**111**	**103**
Quinn	0	0	0	0	0	0	0	30	30
Wall	0	0	0	0	6	6	8	81	73

[1] - E=existing P=proposed I=increase

Table 4.3-18
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 100 MNT - 70 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**0**	**0**	**2**	**22**	**20**	**73**	**171**	**98**
Elkton	0	0	0	0	0	0	26	74	48
Aurora	0	0	0	2	20	18	43	81	38
Arlington	0	0	0	0	1	1	1	1	0
Kingsbury	**0**	**0**	**0**	**0**	**43**	**43**	**124**	**625**	**501**
Arlington	0	0	0	0	1	1	17	102	85
Hetland	0	0	0	0	0	0	6	33	27
Lake Preston	0	0	0	0	8	8	31	131	100
De Smet	0	0	0	0	32	32	54	285	231
Manchester	0	0	0	0	2	2	10	14	4
Iroquois	0	0	0	0	0	0	6	60	56
Beadle	**0**	**0**	**0**	**1**	**13**	**12**	**37**	**514**	**477**
Iroquois	0	0	0	0	1	1	3	25	22
Cavour	0	0	0	0	0	0	3	52	49
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	6	5	16	262	246
Wolsey	0	0	0	0	2	2	10	88	78
Wessington	0	0	0	0	3	3	3	81	78
Hand	**0**	**0**	**0**	**0**	**27**	**27**	**35**	**319**	**284**
Wessington	0	0	0	0	0	0	5	9	4
Vayland	0	0	0	0	0	0	1	8	9
St. Lawrence	0	0	0	0	2	2	1	74	73
Miller	0	0	0	0	25	25	27	193	166
Ree Heights	0	0	0	0	0	0	0	22	22
Hyde	**0**	**1**	**1**	**0**	**0**	**0**	**7**	**125**	**118**
Highmore	0	0	0	0	0	0	6	123	117
Holabird	0	0	0	0	0	0	0	2	2

Table 4.3-18
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 100 MNT - 70 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**7**	**7**	**0**	**39**	**39**	**155**	**1,565**	**1,410**
Harrold	0	0	0	0	1	1	3	58	55
Blunt	0	1	1	0	1	1	3	36	33
Canning	0	0	0	0	0	0	0	9	9
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	5	5	0	37	37	148	1,462	1,314
Stanley	**0**	**4**	**4**	**0**	**19**	**19**	**57**	**324**	**267**
Ft. Pierre	0	3	3	0	17	17	56	314	258
Wendte	0	0	0	0	2	2	1	4	3
Jones	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	0	0	0	0	0	0	0	0
Haakon	**0**	**8**	**8**	**0**	**20**	**20**	**24**	**172**	**148**
Midland	0	0	0	0	6	6	12	46	34
Nowlin	0	0	0	0	0	0	0	5	5
Powell	0	0	0	0	0	0	0	0	0
Philip	0	6	6	0	14	14	12	120	108
Jackson	**0**	**0**	**0**	**0**	**2**	**2**	**1**	**10**	**9**
Cottonwood	0	0	0	0	2	2	1	10	9
Pennington	**0**	**0**	**0**	**0**	**3**	**3**	**8**	**120**	**112**
Quinn	0	0	0	0	0	0	0	30	30
Wall	0	0	0	0	3	3	8	90	82

[1] - E=existing P=proposed I=increase

Under all the projected levels of operation, a significant number of noise sensitive receptors would be subjected to increased levels of noise. The majority of these noise sensitive receptors would be residences located within the small communities along the rail line. The most significant increase in noise levels would result from the increased sounding of train horns at grade crossings due to more trains passing through the crossings. However, additional noise sensitive receptors would be affected by increased wayside noise while others would experience an increase in both wayside and horn noise exposure. In fact, for many of the communities along the rail line, the entire community would fall within the calculated noise contour at some level of operation. These communities and the levels of operation at which the entire community would be within the 65 dBA L_{dn} are given in Table 4.3-19. SEA determined the overall increase in noise sensitive receptors exposed to noise levels of 65 dBA L_{dn} or greater would be significant at all levels of projected future rail line operation.

Table 4.3-19
Communities within 65 dBA L_{dn} Noise Contour*

Community	Condition			
	Existing	20 MNT	50 MNT	100 MNT
Aurora			X	X
Hetland			X	X
Manchester		X	X	X
Cavour				X
Wessington				X
Vayland			X	X
Holabird			X	X
Harrold				X
Canning			X	X
Wendte			X	X
Van Metre		X	X	X
Midland				X
Nowlin		X	X	X

Table 4.3-19 Communities within 65 dBA L_{dn} Noise Contour*				
Community	**Condition**			
	Existing	**20 MNT**	**50 MNT**	**100 MNT**
Powell		X	X	X
Cottonwood			X	X
Quinn			X	X
* "X" denotes level at which entire community would be within the 65 dBA L_{dn} contour.				

SEA recognizes that the majority of noise generated by trains during operation` results from horn soundings. Train horn soundings are deliberately caused, and in many states, required by law, to enhance the safety of vehicles at grade crossings of active rail lines. SEA understands that horn noise can create an adverse environmental impact and is an annoyance. However, SEA has refrained from requiring mitigation of horn noise in past cases, indicating that "any attempt to significantly reduce [train horn] noise levels at grade crossings would jeopardize safety, which we consider to be of paramount importance."[10] A study by the Federal Railroad Administration (FRA) evaluating the impacts of whistle free crossings in Florida on rail safety provides support for SEA's position. In its study, FRA determined vehicle/train accidents increased between 195 and 500 percent. The study depends on considerations such as how many accidents whistles would not have prevented, and what constituted an accident at crossings where whistle soundings were banned.[11] Additionally, in a joint study between FRA and the Association of American Railroads (AAR), it was determined that crossings with whistle bans averaged 84 percent more collisions than comparable crossings where whistles were sounded.[12]

Recent Federal legislation, specifically the Swift Act (49 U.S.C. 20153), directs the Secretary of the Department of Transportation (DOT) to develop regulations relating to noise and rail safety measures. FRA is the Federal agency within DOT with primary responsibility for

[10] Surface Transportation Board, Section of Environmental Analysis. *Union Pacific Railroad-Control-Southern Pacific Railroad*, Decision No. 44, Finance Docket No. 32760, August 12, 1996.

[11] Federal Railroad Administration. 1999. Cited in *Use of Locomotive Horns at Highway-Rail Grade Crossings; Proposed Rule*. Docket No. FRA-1999-6439, Notice No. 1. Issued December 16, 1999. Federal Register, January 13, 2000.

[12] Ibid.

establishing train horn requirements and alternatives. On January 13, 2000, FRA published a Notice of Proposed Rulemaking in the Federal Register that proposes requirements for locomotive horn sounding at grade crossings and a procedure for the establishment of "quiet zones" for train horns. FRA defines a quiet zone as a "segment of rail line within which is situated one or a number of consecutive highway-rail crossings at which locomotive horns are not routinely sounded." FRA's proposal includes establishing an application process for communities to obtain FRA approval to establish quiet zones. Approval would require the community to implement supplemental safety measures, such as four-quadrant gates, directional horns, median barriers, temporary road closures, or other measures determined by FRA to be effective at enhancing grade crossing safety. FRA has prepared a Draft EIS as part of its proposed rulemaking. Following completion of its EIS process, FRA will publish the final rule. The final rule will take affect one year after its publication. However, no dates for publication of the final rule have been proposed. SEA believes that FRA's final regulations will provide a safe, effective means to address horn noise concerns and encourages communities along the existing DM&E rail line to participate in FRA's process.

4.3.9.2 Vibration

Operation of the proposed project would likely result in changes in ground vibration caused by operation of trains over the existing rail line. Replacement of jointed rail and deteriorated ballast may help reduce ground vibration. However, the increased length, weight, and frequency of unit coal trains as compared to freight trains, although similar to unit grain trains, would likely result in increases in the magnitude and occurrence of ground vibration.

Ground vibration may be a concern for several reasons. These include:

- structural damage to buildings and residences
- concern for structural damage
- nuisance or inconvenience
- affects on sensitive equipment, such as precision manufacturing tools, electron microscopes, magnetic resonance imaging systems, bench microscopes, micro-balances, laer interferometers, and magnetometers.

Ground vibration undoubtedly occurs along the existing DM&E rail line and was reported by residents along the rail line during the scoping process.

The magnitude of existing vibration is a result of the type of trains currently operating on the existing DM&E rail line and the characteristics of the soils adjacent to specific portions of the rail line. Ground vibration is highly dependent on the specific soil characteristics (shear stiffness, uniformity, depth to rock, percentage of clay, sand, loam, or other soil particles) at a particular location. Although soils would not change as a result of this project, the weight of trains operating on the existing rail line would increase. This would have the potential to increase the magnitude of ground vibration. The magnitude of vibration would be the same for all levels of operation because it is caused by only a single train event. The magnitude of vibration would not increase with more trains, only the frequency at which the vibration events would occur.

SEA conservatively determined that ground vibration could be sufficient to cause structural damage to buildings located within 100 feet of the rail line (Appendix F). Table 4.3-20 provides the number of structures within this distance. Structural damage may not result in conditions requiring repair or concern over structure stability, such as minor cracks in foundations or plaster walls. Additionally, individuals occupying these structures would experience vibration at levels likely to cause disturbance to daily life and be considered a nuisance. Such disturbances could include rattling of windows, items on tables, walls, and shelves and interruption of sleep, conversation, or listening activities (television, radio), similar to those many of these residents may currently be experiencing. These structures could experience minor damage such as cracking of wall or foundations and breakage of items falling from tables, walls, or shelves due to rattling.

Beyond 100 feet, ground vibration would be expected to lessen to a magnitude that would not result in structural damage. However, SEA determined that between 101 and 200 feet, ground vibration could be of sufficient magnitude to cause concern that structural damage would occur. Structural damage within this range would be unlikely. However, ground vibration may be felt at a level great enough to cause building owners and residents to be concerned that damage would occur. These individuals could experience continual concern and frustration worrying about potential damage. Their quality of life may be reduced as a result of frequent vibration events and the potential disturbance and inconvenience associated with rattling of windows, walls, pictures, and items on shelves and minor damage that may occur from items breaking from rattling off tables, walls, or shelves.

Ground vibration is anticipated to extend outward from the existing rail line for several hundred feet. Beyond 200 feet, ground vibration may still be above the level of human perception. SEA determined that structures between 201 and 400 feet from the rail line could perceive some level of ground vibration. This vibration would present an inconvenience or annoyance to individuals experiencing it. However, it would not be expected to cause any structural damage or significant reduction in individuals' quality of life.

Ground vibration, even at levels below those perceived by humans, may effect sensitive equipment such as that found in hospitals, major medical facilities, and certain types of manufacturing facilities. SEA did not identify any such facilities along the existing rail line in

South Dakota close enough to the rail line to be of concern. Therefore, no impacts would be anticipated.

Table 4.3-20
Existing Rail Line - South Dakota
Structures Potentially Impacted by Vibration

County and Community	0 - 100 Feet	101 - 200 Feet	201 - 400 Feet	Total
Brookings	**3**	**21**	**41**	**65**
Elkton	0	0	19	19
Aurora	3	21	17	41
Kingsbury	**0**	**34**	**131**	**165**
Arlington	0	1	31	32
Hetland	0	0	9	9
Lake Preston	0	7	32	39
Desmet	0	26	40	66
Manchester	0	0	10	10
Iroquois	0	0	7	7
Beadle	**1**	**14**	**61**	**76**
Cavour	0	0	7	7
Huron	1	5	20	26
Wolsey	0	2	14	16
Wessington	0	5	14	19
Hand	**3**	**10**	**51**	**64**
Vayland	0	0	3	3
St. Lawrence	1	1	9	11
Miller	2	8	34	44
Ree Heights	0	0	3	3
Hyde	**0**	**4**	**18**	**22**
Highmore	0	4	17	21
Holabird	0	0	0	0
Hughes	**1**	**1**	**96**	**98**
Harrold	1	0	9	10
Blunt	0	1	3	4
Canning	0	0	4	4
Rousseau	0	0	12	12
Pierre	0	0	63	63

Table 4.3-20
Existing Rail Line - South Dakota
Structures Potentially Impacted by Vibration

County and Community	0 - 100 Feet	101 - 200 Feet	201 - 400 Feet	Total
Stanley	**4**	**12**	**38**	**54**
Ft Pierre	4	9	29	42
Wendte	0	2	2	4
Jones	**0**	**1**	**4**	**5**
Capa	0	0	1	1
Haakon	**2**	**21**	**52**	**75**
Midland	0	5	16	21
Nolin	0	0	2	2
Powell	0	1	0	1
Phillip	1	12	23	36
Jackson	**0**	**1**	**2**	**3**
Cottonwood	0	1	2	3
Pennington	**1**	**11**	**40**	**52**
Quinn	0	0	13	13
Wall	1	9	27	37

4.3.10 BIOLOGICAL RESOURCES

Biological resources include vegetation (Section 4.3.10.1); wildlife (Section 4.3.10.2); aquatic resources (Section 4.3.10.3); and sensitive, threatened, and endangered species (Section 4.3.10.4). SEA determined that the potential for impacts to biological resources would occur primarily during reconstruction of the existing rail line. Operational changes and increases in train traffic would have little effect on biological resources.

4.3.10.1 Vegetation

Construction activities associated with the reconstruction of the rail line would impact vegetation currently present in the right-of-way. The area impacted during construction would include all vegetation within the existing 50 to 250-foot wide right-of-way, the majority of which is grassland. Vegetation within the right-of-way would be cleared or disturbed during reconstruction activities. Following completion of reconstruction, cleared and disturbed areas would be revegetated, resulting in little loss to the vegetative community. The exception would be at locations where siding would be constructed. In these areas, the rail bed would be expanded and the additional area of right-of-way no longer available for vegetation. Wetland areas within the right-of-way would be lost during reconstruction as described in Section 4.3.7.2.

Ground and vegetative disturbance within the right-of-way could provide opportunities for establishment of noxious weeds. The right-of-way would then be a refuge for these species to survive and provide seed to invade other areas, including native prairie and croplands. Timely revegetation of the right-of-way and application of herbicides would help reduce noxious weed invasion.

The existing DM&E rail line in South Dakota passes through 180 miles of pasture land, 300 miles of cropland, nearly 50 miles of woody vegetation, and approximately 132.9 acres of wetlands. This vegetation outside the right-of-way may be impacted during reconstruction. Woody vegetation such as trees and shrubs could be cleared, and grasses, crops, and prairie disturbed if reconstruction activities are required outside the right-of-way. In addition, trees adjacent to the rail line may be trimmed or cut to allow safe operation of the reconstruction equipment. Disturbance of adjacent areas is only expected to occur in small, scattered locations.

Vegetation control activities potentially include herbicide application to the rail grade, burning the right-of-way on both sides of the track, and sterilizing the right-of-way on both sides of the centerline. Loss or damage to desirable vegetation within the right-of-way as well as adjacent to the right-of-way could occur during these maintenance activities.

Missouri River Bridge

Minimal removal of trees and vegetation could be required for reinforcement of the existing bridge footings during its rehabilitation. Construction of a new bridge would require the removal of vegetation and trees along the new alignment. Impacts associated with the removal of existing vegetation are described above.

4.3.10.2 Wildlife

Wildlife in the project area may be affected during both the short reconstruction period and by continued operation of the rail line. These affects would include habitat loss (both temporary and permanent), noise, train-wildlife collisions, increased human activity, and the possible introduction of contaminants into the environment. In general, wildlife along the existing rail line are habituated to the existing rail line; however, with the increased frequency of trains and their increased speed, some wildlife disturbance and mortality would be anticipated. The following Sections describe the potential impacts to the various types of wildlife found along the existing rail line.

4.3.10.2.1 Big Game

Deer (located along the entire rail line) and antelope (limited to the western end of the rail line) inhabiting areas adjacent to the existing rail line are likely to be displaced during reconstruction. Noise, habitat disturbance from reconstruction activities, and human activity would cause big game to seek undisturbed and more secure areas away from the rail line. These same individuals would likely return to the area once reconstruction and reclamation of disturbed areas has been completed. The overall impact of construction-related displacement on local deer and antelope populations would be relatively short-term and limited to the duration of reconstruction and reclamation through a particular area. If the reconstruction would extend into the winter, a period of higher stress for wildlife, it could increase the mortality rate of big game, particularly if important winter shelter habitat is lost or in close proximity to the reconstruction area. Other reconstruction-related impacts that could occur include increased hunting and poaching pressure from the presence of reconstruction crews, and mortality related to increased vehicle and equipment traffic.

Operational impacts would primarily be mortality to big game being struck by trains. Deer and antelope unfamiliar with the train, especially the young, would be most susceptible. Any mortality would be greatest during the first few years of operation, as individuals would not be accustomed to increased train activity and speeds. Over time, individuals remaining in habitats along the existing rail line would adapt to more frequent trains and increased speeds and mortality and disturbance would be reduced. Deer and antelope mortality from trains is not expected to result in significant adverse impacts to local big game populations. However, because of the limited number of antelope in South Dakota, any loss of antelope could result in localized overall population declines.

4.3.10.2.2 Game Species

<u>Upland Birds</u>

Pheasants, sharp-tailed grouse, turkey, and mourning dove may occur along and adjacent to the existing rail line. During reconstruction, loss of habitat and reconstruction activity within the right-of-way would displace individuals using habitat within the right-of-way. Individuals using areas immediately adjacent to the right-of-way would also likely move to other areas away from reconstruction activities. Ground nesters, such as pheasants, grouse, and turkeys, may experience some loss of nests from reconstruction equipment operating within the right-of-way.

However, any losses would likely be minimal and insignificant due to the limited area within the right-of-way. Removal of trees would reduce nesting locations for dove. Increased hunting pressure and poaching could also result from the influx of reconstruction workers. However, any losses would likely be insignificant due to the limited area provided by the rail right-of-way and the limited opportunity workers would have for hunting activities.

During rail line operation, impacts to game birds would be primarily from disturbance due to passing trains. Birds using the right-of-way and areas immediately adjacent to it would likely be disturbed and fly when a train was passing. When birds were nesting, leaving the nest could result in nest failure due to exposure of eggs or chicks to predators or the weather. However, these losses would be minimal, as chicks of these species leave the nest shortly after hatching and are capable of hiding. In times of severe winter weather conditions, flushing of birds from cover could result in use of valuable energy reserves and increased exposure, resulting in mortality. Again, these losses would be minimal and only expected during unusually severe weather. In rare instances, birds could flush in the path of the train and be killed. However, these losses would be insignificant to the overall population. Additionally, once the rail right-of-way is revegetated, higher quality nesting and cover habitat than provided by adjacent croplands and grazing land would be available for upland birds within the right-of-way.

Waterfowl

Waterfowl are abundant in project area wetlands, and often utilize adjacent grasslands and cropland for nesting. Waterfowl using these areas during construction for nesting or resting would likely be displaced during the reconstruction period. Noise and human activity would also disturb waterfowl. Loss of wetlands and grasslands in the right-of-way would reduce waterfowl habitat. Reconstruction during nesting could result in destruction of nests and loss of nesting hens within the right-of-way. The potential spills of materials such as gasoline, diesel fuel, lubricating oil, solvents, etc., could contaminate wetlands, reducing water quality and reducing waterfowl invertebrate forage. Loss of waterfowl would be insignificant due to the limited amount of habitat in the right-of-way.

During operation, impacts to waterfowl would be primarily due to disturbance from passing trains. Birds close to the rail line would be displaced to more remote areas. Suitable nesting habitat within the right-of-way would likely be unused as frequent rail operations would cause hens to nest elsewhere. This would reduce the likelihood of mortality to chicks from passing trains. In rare instances, birds could be struck by passing trains.

Small Game and Furbearers

Mammals could initially be displaced during reconstruction of the rail line. However, it is anticipated that most mammals would return to the area once human activity has decreased and reconstruction and reclamation of the right-of-way completed. With increased activity during construction, there is the possibility that increased hunting and poaching could occur. Animals could suffer increased mortality as “road-kill” struck by either trains or vehicles. However, short-term losses of mammals would not significantly impact populations or distributions of these species. Once reclamation of the rail line is complete, it is anticipated that mammals would utilize the reestablished habitat and, due to their high reproductive potential, quickly repopulate the area.

4.3.10.2.3 Non-Game Species

Amphibians and Reptiles

Many of the amphibian and reptile species found within the construction area would be displaced or eliminated during construction. Their limited mobility would make it difficult for them to avoid reconstruction equipment. The loss of wetlands and other vegetation would reduce the amount of potential habitat. Increased mortality of some species could also occur because of increased road traffic. Additionally, potential spills of materials such as gasoline, diesel fuel etc., could negatively affect species inhabiting waterways and wetland areas. However, it is anticipated that most species would return once revegetation has been successfully completed. The reconstruction of the DM&E rail line would not significantly impact local amphibian and reptile populations.

Missouri River Bridge

Rehabilitation or construction along the Missouri River could cause disturbance, dislocation, and potential loss of habitat for aquatic species located in proximity of such activities. Some mortality could occur during construction. Impacts would not be significant.

Songbirds

Short-term impacts to songbirds include temporary displacement due to reconstruction activity and human presence and possible loss of edge habitat along right-of-way fence lines due to clearing or trimming of trees and shrubby vegetation. Some loss of nests could occur to both tree and ground nesting species. Noise may also result in disturbance to some species using the right-of-way and adjacent areas. Operation and maintenance of the rail line is not expected to impact songbirds, as many species have adapted to human activity. Once revegetation of the right-of-way is completed, habitat for a variety of species would be available.

Shorebirds

Shorebirds may be found in project area wetlands and riverine systems with adequate habitat for nesting and foraging. Impacts to shorebirds would be similar to those discussed for waterfowl.

Small Mammals

Impacts to small mammals, primarily rodents, and insectivores (excluding bats), would primarily occur during the rebuild of the existing rail line. Small mammal populations found within the area of construction would be displaced or eliminated during reconstruction. Increased mortality could also occur due to increased road traffic. Once reclamation has taken place along the right-of-way, small mammals are expected to return to the area. Loss of small mammals in the right-of-way is expected to be insignificant.

During operation, impacts to small mammals would primarily result from mortality from passing trains and individuals becoming trapped between the rails. However, losses would be minimal and insignificant.

Raptors

Several raptor species nest, hunt, or winter along the existing rail line. Most raptors are intolerant of human activity during the breeding and nesting seasons. Some raptors would be displaced, probably only until reconstruction is completed. Some hunting and roosting habitat could be removed if trees are cleared and populations of prey species could be altered. Use of the right-of-way by raptors during reconstruction would be expected to decline. Following construction and revegetation, prey species would be expected to return and raptors would use the area for feeding. However, any previous nesting near or in the right-of-way may not resume as a result of the increase in rail traffic. It is possible that some raptors would adapt to the disturbance from passing trains and nest in suitable habitat adjacent to the rail line. During operation, raptors feeding on carrion along the rail line or flying low along or across the rail line may be killed by trains. However, mortality is anticipated to be minimal and insignificant to overall raptor populations in the project area.

4.3.10.3 Aquatics and Fisheries

The existing DM&E right-of-way in South Dakota crosses several rivers, streams, and lakes that provide habitat for a variety of fish and mussel species. However, no trout fisheries are crossed by the existing rail line in South Dakota. Warm water fish species (largemouth bass, catfish, sunfish) as well as those preferring cooler water (walleye, pike, smallmouth bass) are present throughout South Dakota lakes, streams, and rivers. Many of these species are tolerant of temporary increases in total suspended solids (TSS).

Rail line reconstruction activities could affect fisheries with an increase in TSS and loss of habitat. In addition, once the rail line is in operation, potential releases of petroleum products and right-of-way herbicide use could affect fish and mussels.

The impacts to fish and mussels during reconstruction would occur primarily as a result of increases in TSS. Increased TSS may affect fish populations by:

- preventing successful development of fish eggs and larvae,
- modifying natural movements and migrations,
- reducing the abundance of food,
- clogging and abrading gills, and
- altering available habitat.

If waterway reconstruction activities were to take place near a fish spawning site during or immediately after spawning, increased TSS from disturbance to bottom sediments and erosion could result in reduced survival of eggs and fry. In addition, increases in TSS could cause fish to migrate out of sections of the river temporarily. In-stream work for replacement of bridges and culverts, stream channelization, and bank stabilization activities could alter or destroy aquatic habits. Disturbance to bottom substrates could eliminate gravel beds at the site or downstream due to sedimentation. Removal of debris, channelization, and stabilization would reduce structure and cover in the stream. Alteration of riffle, run, and pool areas could occur from channelization and stabilization in the immediate area of stream crossings, reducing stream habitat diversity and the habitat for species using these areas.

Mussel populations downstream of reconstruction locations, particularly sites of bridge or culvert replacement, would be susceptible to increased TSS. Individuals or entire beds could be lost from reduction in food, damage to gills, or being silted over with sediment. If mussels occur in areas of in-stream work, loss of individuals would be expected from reconstruction equipment and activities within the stream.

The impacts to fish and mussels from rail line operations would occur primarily in the unlikely event of a fuel or chemical spill, or herbicide applications to the right-of-way. The impact of a fuel or chemical spill on fish would depend on the type and quantity of the chemical spilled, the dispersion in the river or lake, fish present in the spill area, and the clean-up procedures employed. The primary commodity carried by DM&E trains would be coal which is relatively inert and non-toxic. A derailment and spill of coal into an area stream would likely result in an increase in TSS and potential impacts associated with such an increase as previously discussed. The only fuel or chemicals that would be carried by coal trains are those that are needed for the operation of the train. Small fish and aquatic invertebrates would be the most sensitive to any chemical spills. Overall, the improved condition of DM&E's rail line would reduce the potential for derailments that could result in release of hazardous materials. No changes in the quantity of hazardous materials shipped would occur and the improved condition of the rail line would reduce the likelihood of a derailment and subsequent spill.

The impacts from the use of herbicides to maintain the right-of-way would be dependent on the type and quantity of the herbicide used. Impacts from herbicide use would be minimized by employing proper application procedures and by using herbicides labeled as being non-toxic to aquatic organisms.

<u>Missouri River Bridge</u>

It is unlikely that fish or aquatic life would be impacted by the rehabilitation of the existing bridge over the Missouri River. Reinforcement of existing piers could cause minor disturbance to bottom sediments and thus locally increase TSS. Materials removed or replaced on the existing bridge could be accidently dropped to the river below and would serve as structure for fish and other aquatic life. It is possible that hazardous chemicals could be accidently discharged during bridge reinforcement. However, limited equipment would be on the bridge itself and the equipment present would contain only the amount of fuel and lubricant necessary for its operation. Safe handling and adherence to regulatory procedures will help prevent an accidental discharge in to the river.

During rail operations, use of the track could result in a derailment or spill releasing coal or petroleum products that could damage fish or aquatic life. The likelihood of this occurring is minimal, as the new rail line would be safer than the existing conditions of the track.

If the building of a new bridge is the option chosen, impacts to fish and aquatic life would likely be greater than those associated with reinforcing the existing bridge. The construction of the bridge would require in-stream work to place new bridge piers. Such work would likely result in an increase in TSS. Degradation of aquatic habitat would occur during pier construction. If the bridge construction occurred while fish were spawning, sediment disturbance could cause some loss of eggs and young. In addition, mussels and other aquatic life could also be impacted, as previously discussed during bridge construction, if sediment levels were to increase. Such increases would only be expected during construction of piers which should be limited to one construction season. During this time, increased TSS would only be expected for a short distance downstream of the construction area due to the large volume of water and its flowing nature at the bridge location. Other construction related impacts would be similar to those of bridge reconstruction, including accidental dropping of construction material and release of hazardous materials. Construction impacts would be short-term, and should not result in significant impacts to aquatic life.

The operation impacts should be similar to those occurring at this time with the existing bridge. Additional piers would also provide additional structure for fish and opportunities for fishing locations. However, increased use of the rail line could increase the likelihood of an accidental discharge of hazardous materials that may impact fisheries. However, as discussed in the previous Section, the new rail line would be safer and the likelihood of a derailment minimal.

If the existing bridge would require removal subsequent to the potential construction of a new bridge, impacts to water quality would be similar to those which would occur during construction activities. Pier removal and abutment work may cause temporary increases in TSS and sedimentation.

4.3.10.4 Endangered, Threatened and Sensitive Species

Potential impacts to Federally listed endangered or threatened species, species proposed for listing, candidate species, and species with special status recognized by the USFWS could include:

- The death of individuals of the species.
- Reduced recruitment and/or survival of individuals, slowing the species' recovery or expansion of current populations.
- Loss of Federally designated critical habitats.
- Loss of known habitat
- Contribute to other causes of species decline resulting in an unlisted species, particularly a candidate or species of concern, warranting consideration for or being proposed for listing as Federally threatened or endangered.

Impacts on Federally listed species were considered and evaluated if the species potentially occurs in the vicinity of any proposed alternative. The species would be considered potentially impacted by the project if any alternative could result in:

- Direct mortality of individuals.
- Long-term or permanent loss or alteration of existing or potential habitat necessary for the life history functions (breeding, wintering, or migration) of one or more threatened or endangered species.

The following Section discusses the Federally listed species potentially affected by reconstruction of the existing rail line in South Dakota. These species include the Topeka shiner, American burying beetle, bald eagle, piping plover, interior least tern, and pallid sturgeon.

4.3.10.4.1 Topeka Shiner

The existing rail line crosses 41 streams known or potentially containing Topeka shiners. During reconstruction of bridges and culverts at these stream crossings, Topeka shiners at the crossing and downstream could be adversely affected should erosion or disturbance of bottom sediments increase TSS. In-stream work may also damage or destroy suitable shiner habitat at the crossing. If petroleum products were accidentally discharged into aquatic environments, Topeka shiner populations could be affected if individuals are harmed or killed. Short-term impacts could also occur during reconstruction due to runoff from reconstruction sites near waterways increasing stream sedimentation.

During operation, derailments and accidental releases of diesel fuels and other petroleum products into streams and rivers containing Topeka shiners could harm shiner populations. Spills of coal could increase TSS. Impacts would be most likely if potential discharge sites are at or within 500 feet of surface waters containing shiners where there may be insufficient riparian vegetation to prevent flows from entering drainages. However, derailments are considered by DM&E to be unlikely because of the improved condition of the rail line following reconstruction.

4.3.10.4.2 American Burying Beetle

American burying beetle habitat may be disturbed or lost during reconstruction and operation of the rail line. Surveys in the proposed project area for the American burying beetle have not been conducted; therefore it is unknown if American burying beetle populations exist. Although not documented in the vicinity of the existing rail line in South Dakota, American burying beetles could occur in suitable soils, including those with high sand content, high erosion hazard, and those with relatively well developed topsoil such as prime farmland, but not subject to irrigation and/or cultivation. The most likely impacts would occur during reconstruction. Earthmoving and excavation activities resulting in soil disturbance and compaction would likely kill any beetles buried in the soil. Once reconstruction is completed, it is unlikely the right-of-way would be suitable habitat for the beetle due to soil disturbance, compaction, and conversion to rail line right-of-way.

Attraction to, disorientation from, and subsequent injury or death due to artificial lights which are known to attract and disorient many species of nocturnal insects, could occur if reconstruction takes place at night and American burying beetles occur along the existing rail line. Security lighting may also have similar affects.

If artificial lights are placed along the rail line as part of rail line and facilities operation, American burying beetles could be attracted to the lights and become disoriented. Carrion on the rail line could attract burying beetles, resulting in them potentially being struck by passing trains. However, rail line operations are not expected to have any impact on the American burying beetled due to its questionable occurrence along the rail line.

4.3.10.4.3 Bald Eagle

Since bald eagles tend to avoid human activities during all times of the year, reconstruction activities could temporarily displace eagles during their migration, wintering, and nesting periods. However, the existing rail line passes through little bald eagle habitat. No bald eagle nests are known along the existing rail line in South Dakota. Potential bald eagle habitat in South Dakota along the existing rail line consists of potential wintering habitat and roosting areas in the Pierre area and along the Bad River. As most reconstruction activities would be limited to outside the winter period, only the minimal loss of some trees suitable as bald eagle wintering roost sites or perching sites removed during reconstruction would affect wintering eagles. As clearing would occur when eagles were absent, it is expected to have little if any affect on them.

Bald eagles are known to congregate along the Missouri River below Lake Oahe, downstream of Pierre. Open water and an availability of fish and waterfowl likely draw eagles to this area. Since wintering bald eagles in some areas feed on big game carrion, eagles in the Pierre area may be drawn to carrion along the rail line during rail line operation, particularly the young that are less experienced hunters. These individuals may take advantage of carrion along the rail line and may suffer injury or direct mortalities if struck by a passing train. It is unlikely that slow moving construction vehicles would inadvertently kill eagles feeding on carcasses, but personal vehicles driven to and from construction sites are more likely to kill eagles feeding on road killed carrion.

4.3.10.4.4 Piping Plover

The piping plover occurs within the project area along the Missouri River. Noise disturbance during reconstruction of the rail line or the Missouri River bridge could affect nesting piping plovers. However sandbars and other suitable nesting areas are not known within proximity to the existing rail line or bridge over the river. Petroleum spills could affect aquatic invertebrates which plovers rely on for food. However, this impact would be unlikely due to such materials being stored away from waterways and only limited quantities being at construction sites.

The potential operation and maintenance activities could result in spills of coal, hazardous materials, or herbicides into the river that could reduce or contaminate plover food supplies. However, as noted above, only limited quantities of these materials would likely be spilled and derailments would be unlikely due to the improved condition of the rail line.

4.3.10.4.5 Interior Least Tern

Interior least terns are known to occur within the project area along the Missouri River. Short-term impacts could occur to nesting terns during construction. Because their habits are similar to piping plovers, project reconstruction and operation impacts would be similar to those discussed for piping plovers.

4.3.10.4.6 Pallid Sturgeon

Missouri River Bridge Impacts

Pallid sturgeons are known to occur in the Missouri River downstream of the existing DM&E bridge over the river. This species could be adversely affected if petroleum products were accidentally discharged into waterways during either reinforcement of the existing bridge or construction of a new bridge. An accidental discharge of these materials would be toxic to algae, invertebrates, and fish, reducing the sturgeon's food sources. Increased TSS during new bridge construction could also reduce sturgeon forage. However, rehabilitation or construction and operation of the bridge should not significantly impact the pallid sturgeon or its habitat.

4.3.11 TRANSPORTATION

Chapter 4, Section 4.1.9 gives a detailed description of the transportation facilities in the project area. Reconstruction activities would have temporary, short-term impacts on existing transportation systems, including Federal, state, county and private roads. These impacts would result from the transportation of materials and crews to work sites and reconstruction activities occurring at existing grade crossings. Transportation of materials in heavy trucks and movement of construction equipment could accelerate wear and tear on local highways. Rural roadways and bridges incapable of supporting construction traffic would require upgrading for safe transportation. Existing road crossings, both grade and grade separated, may require closure and associated detours during reconstruction of the crossing. These closures would reroute normal traffic patterns, potentially increasing traffic and congestion in residential areas and on low volume roadways. Partial closures of grade crossings, such as one direction of traffic, during reconstruction would cause delays to motorists at that particular crossing. Additionally, routes for emergency vehicle response would have to be redesigned to avoid closed roadways. Pedestrian traffic would also be impacted at crossings where sidewalks and other pedestrian ways are provided. These routes would also need to be modified to avoid closures, this would prevent pedestrians from adding significant distances to their daily commutes. Based on DM&E's estimate of reconstructing approximately 1.0 mile of rail line per day, any crossing closures or delays would be temporary, lasting only from a day or two to possible a week, depending on the complexity of the crossing.

Reconstruction activities could impact rail traffic, both on the existing DM&E system and the systems of other rail carriers. DM&E has indicated that reconstruction would occur in such a manner as to maintain rail service along its existing rail line. Some delays to trains may occur due to conflicts with reconstruction activities, but no significant impacts are anticipated. Additionally, reconstruction of the DM&E rail line could impact rail operations of other rail carriers due to delays in traffic to be interchanged and reconstruction of rail/rail crossings. Should DM&E experience train delays due to reconstruction, interchanging rail carriers could also experience delays due to crews waiting for trains and rail schedules being altered. While some impacts would likely occur, they should not significantly impact the overall operations of interchanging rail carriers. During reconstruction of the existing crossings of other rail carriers, trains using these crossings may be delayed or rerouted to avoid the crossing. Coordination between the railroads would be imperative to maintain safe rail operations and allow construction activities to occur in a manner least disruptive to either railroad. Some impacts are expected, although they are not expected to be significant, particularly since maintaining safe and efficient rail operations is in the best interest of DM&E and other rail carriers potentially involved.

To analyze the effects of the increased rail traffic on vehicle delays at existing highway/rail crossings, SEA identified crossings along the DM&E system at which the average daily traffic (ADT) would exceed 5,000 vehicles. An ADT less than 5,000 SEA determined would have relatively few drivers who would experience the potential effect of increased train traffic and the associated additional vehicle delay would be minimal. SEA calculated potential changes in vehicle delay at these crossings.

In order to analyze the effects of the proposed reconstruction on the roadway system at existing public highway/rail grade crossings, SEA analyzed the crossings for three proposed levels of operation; 20 MNT, 50 MNT and 100 MNT for train lengths of both 6,400 feet (115 rail cars) and 7,400 feet (135 rail cars). SEA calculated potential changes in vehicle delay at those crossings where ADT volumes are 5,000 or greater. SEA categorized crossings based on the level of service. Levels of service ranged from free-flowing to severely congested and were quantified as shown in Table 4.3-21:

Table 4.3-21
Grade Crossing Levels of Service

Level of Service	Average Total Delay (sec/vehicle)
A	≤5
B	>5 and ≤10
C	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤ 45
F	>45

As part of the transportation analysis, SEA determined the time each crossing would be blocked per train crossing event. This time included the time for warning structures to be deployed, the train to pass, and time for warning structures to be restored after the train has passed.[13] Because train passing time is dependent on train speed and trains would generally be operating at speeds ranging from 45 to 49 miles per hour, SEA conservatively used 45 miles per hour for all calculations concerning vehicle delay. Crossings were estimated to be blocked 2.1 minutes for 115-car trains and 2.4 minutes for 135-car trains. For those crossings DM&E indicated speed restrictions would be imposed, the appropriate speed for the crossing was used to determine the delay time. SEA's methodology for calculating vehicle delay, crossing data considered in the analysis, detailed description of levels of service, and criteria of significance are provided in Appendix G. Significant impacts to traffic from the project were determined by SEA to result from either:

[13] For crossings with passive warning devices, SEA conservatively used the same blocked crossing time per train passing event as active warning devices.

- an average 30 second increase in vehicle delay, level of service rated E or F regardless of the existing condition, or

- a reduction of existing level of service of C or better to a level of D or worse due to the project.

SEA identified two counties in South Dakota with public highway/rail grade crossings meeting the criteria for performing vehicle delay calculations. These are Beadle, and Hughes Counties. The results of SEA's analysis are summarized below. Appendix G contains the data for SEA's calculations.

Beadle County

20 MNT, 6,400 & 7,400 Feet

Two crossings analyzed in Beadle County, in the town of Huron, Dakota Avenue (FRA ID No. 189698H, MP 362.80) and Lincoln Avenue (FRA ID No. 189701N, MP 363.80), would experience reductions in delay per stopped vehicle due to increased train speed. The levels of service under reconstruction condition would be A. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 6 cars per day. The average reduction in stopped delay would be 0.5 minute per vehicle.

50 MNT, 6,400 & 7,400 Feet

Two crossings analyzed in Beadle County, in the town of Huron, Dakota Avenue (FRA ID No. 189698H, MP 362.80) and Lincoln Avenue (FRA ID No. 189701N, MP 363.80), would experience reductions in delay per stopped vehicle. The levels of service under the reconstruction condition would be A for the 6,400 feet train scenario and B for the 7,400 feet scenario. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 6 cars per day. The average reduction in stopped delay would be 0.5 minute per vehicle.

100 MNT, 6,400 & 7,400 Feet

Two crossings analyzed in Beadle County, in the town of Huron, Dakota Avenue (FRA ID No. 189698H, MP 362.80) and Lincoln Avenue (FRA ID No. 189701N, MP 363.80), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction conditions would be B for the 6,400 feet train scenario and C for the 7,400 feet scenario. All crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 6 cars per day. The average reduction in stopped delay would be 0.5 minutes per vehicle.

Hughes County

20 MNT 6,400 & 7,400 Feet

Three crossings analyzed in Hughes County, in the town of Pierre, Highway 14/34 (FRA ID No. 189846A, MP 481.10), Highland Avenue (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction condition would be A. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 5 cars per day. The average reduction in stopped delay would be 0.4 minute per vehicle.

50 MNT 6,400 & 7,400 Feet

Three crossings analyzed in Hughes County, in the town of Pierre, Highway 14/34 (FRA ID No. 189846A, MP 481.10), Highland Avenue (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction condition would be A for the 6,400 feet train scenario and B for the 7,400 feet scenario. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 5 cars per day. The average reduction in stopped delay would be 0.3 minute per vehicle.

100 MNT 6,400 & 7,400 Feet

Three crossings analyzed in Hughes County, in the town of Pierre, Highway 14/34 (FRA ID No. 189846A, MP 481.10), Highland Avenue (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction conditions would be B for the 6,400 feet train scenario and C for the 7,400 feet scenario. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 5 cars per day. The average reduction in stopped delay would be 0.3 minute per vehicle.

Because DM&E's trains would operate at generally greater speeds following rail line reconstruction than current speeds, trains would take less time to pass through a grade crossing. This would result in the reductions in vehicle delay and queue noted above. As such, none of the crossings SEA analyzed would meet SEA's criteria of significant impact. While SEA recognizes the increased train traffic would increase the likelihood motorists would encounter trains and be delayed, the delay would be less than what is currently experienced. SEA determined the proposed increase in rail line traffic would have no significant affect on vehicle traffic in South Dakota.

Emergency Vehicle Response

In many communities along the existing DM&E rail line police, fire, and emergency medical services or ambulance may be required to cross the rail line at grade crossings when responding to emergencies. The potential exists for emergency vehicles to be delayed at grade crossing blocked by a passing train. SEA analyzed the potential for emergency vehicle delay at grade crossings by looking at the nature of emergency responses, the nature of coal train schedules, the crossing delay per stopped vehicle, and the total daily crossing blockage time.

Emergency incidents are random and unpredictable. Where, when, and what the emergency is cannot be predicted. The incident could be a fire on the west of town, a car accident in the midtown area or a burglary in a rural area. Each emergency incident requires different services to respond. A car accident may require police, fire and ambulance, whereas a burglary would only require police response. A timely emergency response may only be necessary in one direction. During a fire or police emergency, delay would only be a factor for travel to the emergency. Equipment delayed returning from the incident would have little, if any impact on safety as the emergency would be over. An exception could be that if fire equipment would be delayed returning to the station, restoring equipment to respond to the next emergency would also be delayed, potentially reducing the ability to respond to a second emergency if it occurred shortly after the first.

Additionally, not all emergency responses are actually emergencies. Of medical emergencies, only from 25 percent (Transportation Research Board 1987) to 5 to 10 percent (Los Angeles County-wide Coordinating Council on Emergency Medical Services 1975) are actually life-threatening. Life threatening medical emergencies are reduced to as little as one percent following on site medical treatment. Only these remaining emergencies would be susceptible to delay in two directions, traveling to the emergency and then to the hospital. Because emergency medical vehicles may be based at fire stations or other non-hospital locations, or may be dispatched while away from the hospital, emergency vehicles responding to an incident could utilize different routes when responding than when transporting a patient to a hospital. Likewise, an emergency vehicle could be directed to use a less direct route to an incident, with better road conditions, in favor of a more direct route with poor road conditions or heavy traffic, depending on the emergency. Therefore, the emergency vehicle may only cross the rail line once during an emergency response.

Determining the consequences of delays to emergency vehicles is further complicated by the time sensitivity of emergency patients to treatment. A study reported by the National Research Council, Transportation Research Board (TRB) reported that only 0.11 percent of emergency patients require prompt emergency room treatment. In this study, "prompt" was defined as on-site treatment within 15 minutes of symptoms or injury and emergency room treatment within 70 minutes. The study also determined that patients in life threatening emergencies would become critical if some treatment was not administered within 30 minutes. The TRB went on to recognize the importance of the patients condition and elapsed time prior to treatment. In recognizing the importance of elapsed time, the TRB pointed out that the closer a patient is to emergency treatment, the less consequential any delay would be to their condition. They indicated " a 5 minute delay at a crossing would not affect patient outcome if the patient is located less than 10 minutes from the ambulance station. On the other hand, if the patient were located almost 15 minutes from the station, a delay of only 1 minute could be critical". TRB did not indicate the consequences of delay when transporting critical patients to a hospital. However, it appears that delay is most critical to medical emergencies when traveling to the emergency.

Further complicating the analysis is that not only are emergency events random, but so are train passings. Freight train schedules are dependent on shippers' needs for transportation. Therefore they may not occur on regular schedules; at consistent times of the day, week, or month. For this project, coal train schedules would be subject to availability at the mine for loading, time for crew changes, fueling, inspections, and access to a particular stretch of rail line. All these make it difficult to predict passing freight train events. The randomness of train events complicates emergency vehicle response. When an emergency call is received the dispatcher does not know whether to expect a train or not. Thus they are unable to identify a route to avoid a passing train unless a grade separation is available and provides the most appropriate route to the emergency. In following the identified route for response, the emergency vehicle may:

- not encounter a train and pass undelayed through the crossing.

- arrive at a crossing just as the train arrives and be required to wait the entire time that the train is passing or detour to another unblocked crossing. Should the emergency vehicle chose to wait, it would likely experience reduced traffic on the other side of the crossing as traffic would have cleared while the train was passing.

Selecting a detour may result in the emergency vehicle experiencing delay along its entire route due to negotiating traffic.

- arrive during the train crossing. Under this circumstance, the emergency vehicle could utilize the oncoming traffic lane to approach the crossing, avoiding any vehicle queue. After the crossing cleared, it could proceed through the crossing ahead of queued vehicles into the appropriate lane of traffic which would have cleared during the passing train.

- arrive shortly after the train has passed, but before traffic flow had been restored to normal. Under this scenario, the emergency vehicle would likely be required to slow down to make its way through traffic.

Based on these scenarios, and minimum train speeds of 40 mph (only applies to crossings with speed restrictions, other crossing would have train speeds of 45 to 49 mph), the most an emergency vehicle would be expected to be delayed would be 2.6 minutes (Table 4.3-22). This represents the crossing delay per stopped vehicle at 40 mph. The crossing delay per stopped vehicle, or total blocked time per train is the longest amount of time a driver would have to wait at a grade crossing to let a train pass. The amount of time a crossing is blocked is based on the length of the train and the speed of travel. The faster a train is moving, the less time the crossing would be blocked (Table 4.3-22). The shorter the train, the less time the crossing is blocked. All existing DM&E grade crossing in South Dakota at all operational levels, would experience a decrease in delay per train event from the existing condition. Delay would range from none, to that similar to negotiating a stop light at a busy intersection to the maximum of 2.6 minutes.

Table 4.3-22
Grade Crossing Delays in Minutes
at Various Train Velocities and Train Lengths

Train Velocity: mph / feet per minute	**115 car Train**	**135 car Train**
	minutes of delay	**minutes of delay**
5 / 440	15.0	17.3
10 / 880	7.8	8.9
15 / 1320	5.3	6.1
20 / 1760	4.1	4.7
25 / 2200	3.4	3.9

Table 4.3-22
Grade Crossing Delays in Minutes
at Various Train Velocities and Train Lengths

Train Velocity: mph / feet per minute	115 car Train	135 car Train
	minutes of delay	minutes of delay
30 / 2640	2.9	3.1
35 / 3080	2.6	2.9
40 / 3520	2.3	2.6
45 / 3960	2.1	2.4
49 / 4312 (Max. Speed)	2.0	2.2

Total daily crossing blockage time could be used as an indicator of the risk of delay at a grade crossing. It influences the likelihood that a crossing would be blocked when an emergency vehicle would need to cross the tracks. This measurement is obtained by multiplying the crossing delay per stopped vehicle by the number of trains per day, giving the total minutes the crossing would be blocked each 24 hour or 1,440 day (Table 4.3-23).

Table 4.3-23
Total Time Per Day Crossings are Blocked at Various Velocities, under Various Operation Levels

Train Velocity: mph/feet per minute	Train length: 115 car			Train length: 135 cars		
	Total minutes delay with 11 trains per day	Total minutes delay with 21 trains per day	Total minutes delay with 37 trains per day	Total minutes delay with 11 trains per day	Total minutes delay with 21 trains per day	Total minutes delay with 37 trains per day
20 / 1,760	45.1	86.1	151.7	51.7	98.7	173.9
25 / 2,200	37.4	71.4	125.8	42.9	81.9	144.3
30 / 2,640	31.9	60.9	107.3	34.1	65.1	114.7
35 / 3,080	28.6	54.6	96.2	31.9	60.9	107.3
40 / 3,520	25.3	48.3	85.1	28.6	54.6	96.2
45 / 3,960	23.1	44.1	77.7	26.4	50.4	88.8
49 / 4,312	22.0	42.0	74.0	24.2	46.2	81.4

The majority of the existing DM&E rail line in South Dakota closely parallels State Highway 14. Proximity to a highway could facilitate emergency vehicles finding an open grade crossing when the preferred route is blocked. In the event of an emergency vehicle finding a grade crossing blocked, it could precede to the front of the line in order to be the first to cross once the crossing is clear. In more rural areas, increased vehicle speed on rural roads with low traffic volumes could be used to reduce response time. Based on an anticipated speed of primarily 45 mph (Table 4.3-21) for DM&E traffic following reconstruction, delays for emergency equipment at the majority of grade crossings on the existing rail line would be brief. However, this delay could be significant when responding to emergencies in rural areas where response times to the site would be greater, as discussed above. While any delay would be less than that emergency vehicles could currently experience based on existing train speeds, the increased number of trains would increase the likelihood of emergency vehicles encountering a train. Slower trains could enable emergency vehicles to travel greater distances to detour around the train. However, faster train speeds would require emergency vehicles to arrive at an open crossing quicker to safely cross the rail line unless proceeding to a crossing through which the train had already passed.

There would be 16 grade crossings on the existing rail line in South Dakota where speeds would be restricted to 40 mph. The Commercial Street / US 281 crossing near Wosley would have a speed restriction of 40 mph due to curves in the track. Likewise, 15 crossings in Pierre, and Fort Pierre would have 40 mph restrictions to allow for crossing the Pierre Bridge over the Missouri River. Delays at crossings with 40 mph restrictions would be slightly longer than those at 45 mph (Table 4.3-22).

Because total daily blocked crossing time would be increased (Table 4.3-23), SEA determined the likelihood of an emergency vehicle responding to an emergency encountering a train would be increased. However, the overall significance of any delay is difficult to determine due to the numerous factors involved and discussed above.

Missouri River Bridge Impacts

Rehabilitation of the existing bridge would result in no changes to the operations of trains over the Missouri River. Although the rehabilitated bridge may be able to accommodate increased train speeds and car weights, the curvature of the approach to the east side of the bridge would not enable speeds to be increased. Construction of a new bridge would require minor realignment of the existing rail line to connect with the new bridge which could enable a reduction of the approach curves and allow for increased train speed. In the event of new bridge construction, rail line traffic would continue to use the existing bridge until the new bridge was placed into service.

4.3.12 SAFETY

The proposed project has the potential to impact vehicle safety at grade crossings, pedestrian safety at designated crossings and along the rail line, and train safety. These impacts could occur during both reconstruction and operation of the project.

During reconstruction at grade crossings, delays and detours for vehicles could be increased. Motorists using these crossings could become frustrated with the conditions and try to cross during reconstruction, beat trains to avoid delay at other grade crossings, or increase speeds along detour routes. These actions, combined with increased traffic congestion along detour routes could result in unsafe conditions for motorists and pedestrians, resulting in increased vehicle/vehicle and vehicle/pedestrian accidents.

Pedestrians may also become frustrated with increased inconvenience from walking further distances and continue to cross at closed crossings, walk along the rail line right-of-way, or cross at unauthorized locations. These actions could result in injury to pedestrians from reconstruction related activities or rail traffic. Additionally, the presence of reconstruction equipment and materials could attract children who could be injured playing around reconstruction sites. Based on DM&E's estimate of reconstructing approximately 1.0 mile of rail line per day, any reconstruction activities at grade crossings would be temporary, lasting only from a day or two to possibly a week, depending on the complexity of the crossing.

During reconstruction, rail safety would be a continual concern. Reconstruction activities could damage the track or incomplete reconstruction could lead to derailments. Prior to operation of trains following reconstruction activities, rail bed and track should be inspected for defects to help reduce the likelihood of derailments. Appropriate coordination between reconstruction and train crews would be important to maintain a safe working environment.

Increased train activity following rail line reconstruction could affect the safety of roadway users at highway/rail grade crossings. To address potential changes in accident frequency, SEA compared existing accident frequency rates with rates at all highway/rail grade crossings that would experience an increase in train traffic following rail line reconstruction. SEA evaluated the accident potential along the entire DM&E rail line in South Dakota at locations where the rail line crosses public roadways grade. This included all of the grade crossings along the existing DM&E rail line from Wall east to the South Dakota/Minnesota border. At these locations, SEA looked at the most recent five years of accident history available, and calculated the potential change in the number of years between accidents. SEA's analysis procedure considered the type of existing warning devices at the highway/rail grade crossings, including passive devices (signs or crossbucks), flashing lights, or gates, ADT at the crossing, and train speed for the crossing. SEA did not analyze grade-separated crossings because these crossings eliminate the potential for train-vehicle accidents by physically separating the roadway from the railroad track.

To evaluate the significance of potential changes in accident frequency in South Dakota, SEA categorized highway/rail grade crossings into two categories:

Category A

Category A consisted of highway/rail grade crossings with relatively frequent train-vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates at or above the states 50^{th} highest rate of one accident every 20 years (0.051 accident frequency rate) to be Category A highway/rail grade crossings. For all Category A highway/rail grade crossings, SEA considered the relatively small accident frequency rate increase of one additional accident every 100 years (a 0.01 accident frequency rate increase) to be significant.

Category B

Category B consisted of highway/rail grade crossings with relatively few train-vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates less than one accident every 20 years (less than 0.051 accident frequency rate) to be Category B highway/rail grade crossings. For these crossings, SEA considered an accident frequency rate increase of one additional accident every 20 years (a 0.05 accident frequency rate increase) to be significant.

SEA identified public grade crossings in each county through which the existing DM&E rail line would pass. SEA analyzed the potential changes in accident frequency at each of these crossings and determined the overall change in accident frequency for each county. The existing public highway/rail grade crossings in each county were analyzed at the 20 MNT, 50 MNT and 100 MNT levels of operation for each of the proposed Extension Alternatives (Alternatives B, C and D). Each grade crossing was analyzed for each Extension Alternative due to the siding plan required for the existing rail line differing for each Extension Alternative. As the presence of multiple sets of tracks at a crossing has an influence on the safety of the crossing, SEA needed to consider each grade crossing under each Extension Alternative as a particular crossing may have a siding track and the rail line under one Extension Alternative, but only the rail line under another Extension Alternative. Because accident frequency increases as train speed increase, SEA conservatively use the maximum operating speed indicated by DM&E, 49 miles per hour, for all safety calculations. However, loaded eastbound coal trains would generally be traveling at 45 miles per hour and trains operating on sidings would average approximately 40 miles per hour.

At those crossings where speed restrictions would be implemented, the maximum speed used in SEA's analysis was the maximum allowable speed for the particular crossing.

The results of SEA's analysis are summarized below. The results presented below apply to all Extension Alternatives unless it is noted otherwise. Appendix H contains the data for SEA's calculations and the results of SEA's analysis for each crossing.

Brookings County

20 MNT

SEA's safety analysis showed that for the 43 public highway/rail grade crossings studied in Brookings County,[14] the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.001 to 0.010. This translates into a range of increase from one accident every 1,498 years to one accident every 101 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several crossings for the reconstruction case, resulting in a system-wide change in accident frequency in Brookings County of 0.098. This represents a predicted increase of one accident every 10 years in the county. A total of 3 accidents occurred at crossings in the County between 1993 and 1997.

50 MNT

SEA's safety analysis showed that for the 26 public highway/rail grade crossings studied in Brookings County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.003 to 0.026. This translates into a range of increase from one accident every 394 years to one accident every 38 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic was significant at crossings Elk Street (FRA ID No. 193786A, MP 274.40), and 459th Ave. (FRA ID No. 197448R, MP 302.80). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Brookings County is 0.342. This represents a predicted increase of one accident every 3 years in the County.

[14] Excludes grade grossing evaluated as part of the Brooking Bypass. SEA's evaluation of these crossings can be found in Section 4.9.

100 MNT

SEA's safety analysis showed that for the 26 public highway/rail grade crossings studied in Brookings County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.005 to 0.045. This translates into a range from 1 accident every 210 years to 1 accident every 22 years, respectively. SEA determined that the predicted increases resulting from the proposed construction was significant at crossings Elk Street (FRA ID No. 193786A, MP 274.40), 459th Ave. (FRA ID No. 197448R, MP 302.80), and State Highway 13 (FRA ID No. 193789V, MP 274.80). These highway/railroad grade crossings are classified at Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Brookings County is 0.588. This represents a predicted increase of one accident every 2 years in the County.

Kingsbury County

20 MNT

SEA's safety analysis showed that for the 45 public highway/rail grade crossings studied in Kingsbury County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.0012 to 0.018. This translates into a range of increase from 1 accident every 861 years to one accident every 56 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic was significant for all of the Extension Alternatives at crossings 450th Ave. (FRA ID No. 197508X, MP 312.60), Main Street (FRA ID No. 197521L, MP 321.00), Calumet Ave. (FRA ID No. 197456H, MP 329.70) and additionally at 441st Ave. (FRA ID No. 197523A, MP 321.70) for Alt. D. These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Kingsbury County is 0.252. This represents a predicted increase of one accident every 4 years in the County.

50 MNT

SEA's safety analysis showed that for the 45 public highway/rail grade crossings studied in Kingsbury County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.0025 to 0.036. This translates into a range of increase from 1 accident every 396 years to 1 accident every 28 years, respectively. SEA determined that the predicted accident increases resulting from the proposed increases in rail traffic were significant at crossings 450th Ave. (FRA ID No. 197508X, MP 312.60), Main Street (FRA ID No. 197521L, MP 321.00, Calumet Ave. (FRA ID No. 197456H, MP 329.70), Lake Ave. (FRA ID No. 197520E, MP 320.90), 441st Ave. (FRA ID No. 197523A, MP 321.70), and Lyle Ave. (FRA ID No. 197685C, MP 329.30). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Kingsbury County is 0.536. This represents a predicted increase of one accident every 2 years in the County.

100 MNT

SEA's safety analysis showed that for the 45 public highway/rail grade crossings studied in Kingsbury County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.004 to 0.053. This translates into a range of increase from 1 accident every 241 years to 1 accident every 19 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic would be significant at crossings Main Street (FRA ID No. 197452F, MP 308.20), 4th Street N. (FRA ID No. 197454U, MP 308.40), Park Ave. (FRA ID No. 197519K, MP 320.70), Prairie Ave. (FRA ID No. 197686J, MP 330.40), Ottawa Street (FRA ID No. 197697W, MP 344.60), 450th Ave. (FRA ID No. 197508X, MP 312.60), Main Street (FRA ID No. 197521L, MP 321.00), Calumet Ave. (FRA ID No. 197456H, MP 329.70), Lake Ave. (FRA ID No. 197520E, MP 320.90), 441st Ave. (FRA ID No. 197523A, MP 321.70), and Lyle Ave. (FRA ID No. 197685C, MP 329.30). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other crossing locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Kingsbury County is 0.813. This represents a predicted increase of one accident every 1.2 years in the County.

Beadle County

20 MNT

SEA's safety analysis showed that for the 39 public highway/rail grade crossings studied in Beadle County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.001 to 0.032. This translates into a range of increase from 1 accident every 696 years to 1 accident every 32 years, respectively. SEA determined that the predicted increases resulting from the proposed rail traffic increase would be significant at crossings US Highway 14 (FRA ID No. 189702V, MP 364.70), 394th Ave (FRA ID No. 189707E, MP 369.00), Commercial Ave. (FRA ID No. 189716D, MP 376.20), and Wessington Street (FRA ID No. 189731F, MP 387.50). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Beadle County is 0.213. This represents a predicted increase of one accident every 5 years in the County.

<u>50 MNT</u>

SEA's safety analysis showed that for the 39 public highway/rail grade crossings studied in Beadle County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.003 to 0.052. This translates into a range of increase from one accident every 333 years to one accident every 19 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic would be significant at crossings Dakota Ave. (FRA ID No. 189698H, MP 362.80), Lincoln Ave. (FRA ID No. 189701N, MP 363.80), US Highway 14 (FRA ID No.189702V, MP 364.70), 394th Ave (FRA ID No. 189707E, MP 369.00), Commercial Ave. (FRA ID No. 189716D, MP 376.20), and Wessington Street (FRA ID No. 189731F, MP 387.50). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Beadle County is 0.440. This represents a predicted increase of one accident every 2 years in the County.

<u>100 MNT</u>

SEA's safety analysis showed that for the 39 public highway/rail grade crossings studied in Beadle County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.003 to 0.076 for Extension Alternative B and 0.005 to 0.076 for Extension Alternatives C and D. This translates into a range of increase from 1 accident every 302 years to 1 accident every 13 years for Alternative B and one accident every 205 years to one accident every 13 years for Alternatives C and D. SEA determined that the predicted increases resulting from the proposed rail traffic increases would be significant at crossings Simmons Ave. (FRA ID

No. 189696U, MP 362.20), and 374th Street (FRA ID No. 189732M, MP 387.70), Dakota Ave. (FRA ID No. 189698H, MP 362.80), Lincoln Ave. (FRA ID No. 189701N, MP 363.80), US Highway 14 (FRA ID No. 189702V, MP 364.70), 394th Ave (FRA ID No. 189707E, MP 369.00), Commercial Ave. (FRA ID No. 189716D, MP 376.20) and Wessington Street (FRA ID No. 189731F, MP 387.50). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Beadle County is 0.704. This represents a predicted increase of one accident every 1.4 years in the County.

Hand County

20 MNT

SEA's safety analysis showed that for the 29 public highway/rail grade crossings studied in Hand County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.0013 to 0.016 for Alternative B and 0.0013 to 0.015 for Alternatives C and D. This translates into a range of increase from 1 accident every 780 years to 1 accident every 61 years for Alternative B and from one accident every 780 years to one accident every 68 years for Alternative C and D. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hand County is 0.135 for Alternative B and 0.128 for Alternatives C and D. This represents a predicted increase in the County of one accident every 7 years for Alternative B and one accident every 8 years for Alternatives C and D.

50 MNT

SEA's safety analysis showed that for the 29 public highway/rail grade crossings studied in Hand County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.002 to 0.025. This translates into a range of increase from 1 accident every 426 years to 1 accident every 41 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Hand County is 0.230. This represents a predicted increase of 1 accident every 4 years in the County.

100 MNT

SEA's safety analysis showed that for the 29 public highway/rail grade crossings studied in Hand County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.004 to 0.034. This translates into a range of increase from 1 accident every 276 years to 1 accident every 29 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at crossings at 3rd Street (FRA ID No. 189755U, MP 402.60) and Broadway Street (FRA ID No. 189756B, MP 402.90). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Hand County is 0.345. This represents a predicted increase of 1 accident every 3 years in the County.

Hyde County

20 MNT

SEA's safety analysis showed that for the 14 public highway/rail grade crossings studied in Hyde County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.001 to 0.010. This translates into a range of increase from 1 accident every 780 years to 1 accident every 104 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hyde County is 0.057. This represents a predicted increase of 1 accident every 18 years in the County.

50 MNT

SEA's safety analysis showed that for the 14 public highway/rail grade crossings studied in Hyde County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.002 to 0.017. This translates into a range of increase from 1 accident every

426 years to 1 accident every 60 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Hyde County is 0.102. This represents a predicted increase of 1 accident every 10 years in the County.

<u>100 MNT</u>

SEA's safety analysis showed that for the 14 public highway/rail grade crossings studied in Hyde County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.004 to 0.024. This translates into a range of increase from 1 accident every 276 years to 1 accident every 41 years, respectively. SEA determined that the predicted increases resulting from the proposed construction was significant at crossing Commercial Street FRA ID No. 789781J, MP 425.00). The highway/rail grade crossings is classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hyde County is 0.153. This represents a predicted increase of 1 accident every 7 years in the County.

Hughes County

<u>20 MNT</u>

SEA's safety analysis showed that for the 23 public highway/rail grade crossings studied in Hughes County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.001 to 0.024. This translates into a range of increase from 1 accident every 859 years to 1 accident every 41 years, respectively. SEA determined that the predicted increases resulting from the proposed construction would be significant at crossings Wyman Ave. (FRA ID No. 189801T, MP 439.90), Industrial Road (FRA ID No. 189843E, MP 480.00) Harrison Street (FRA ID No. 189844L, MP 480.50) and Highway 14 (FRA ID No. 189846A, MP 481.10). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hughes County is 0.224. This represents a predicted increase of 1 accident every 4 years in the County.

50 MNT

SEA's safety analysis showed that for the 23 public highway/rail grade crossings studied in Hughes County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.005 to 0.045. This translates into a range of increase from 1 accident every 196 years to 1 accident every 22 years, respectively. SEA determined that the predicted increases resulting from the proposed rail line traffic increase would be significant at crossings Lowell Road (FRA ID No. 189842X, MP 479.50), Monroe Street (FRA ID No. 189845T, MP 480.70), Highway 14 (189846A, MP 481.10), Ree Street (189847G, MP 481.40), Wyman Ave. (FRA ID No. 189801T, MP 439.90), Industrial Road (FRA ID No. 189843E, MP 480.00), and Harrison Street (FRA ID No. 189844L, MP 480.50). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hughes County is 0.381. This represents a predicted increase of 1 accident every 3 years in the County.

100 MNT

SEA's safety analysis showed that for the 23 public highway/rail grade crossings studied in Hughes County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.002 to 0.066. This translates into a range of increase from 1 accident every 507 years to 1 accident every 15 years, respectively. SEA determined that the predicted increases resulting from the proposed rail traffic increases would be significant at crossings Wyman Ave. (FRA ID No. 189801T, MP 439.90), Industrial Road (FRA ID No. 189843E, MP 480.00), and Harrison Street (FRA ID No. 189844L, MP 480.50), Lowell Road (FRA ID No. 189842X, MP 479.50), Monroe Street (FRA ID No. 189845T, MP 480.70), Highway 14 (FRA ID No. 189846A, MP 481.10), Ree Street (FRA ID No. 189847G, MP 481.40), Highland Ave, (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hughes County is 0.544. This represents a predicted increase of 1 accident every 2 years in the County.

Stanley County

20 MNT

SEA's safety analysis showed that for the 10 public highway/rail grade crossings studied in Stanley County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.019. This translates into a range of increase from 1 accident every 344 years to 1 accident every 53 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at crossings 7th Ave. (FRA ID No. 189858U, MP 484.10) and Main Ave. (FRA ID No. 189861C, MP 484.60). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Stanley County is 0.095. This represents a predicted increase of 1 accident every 11 years in the County.

50 MNT

SEA's safety analysis showed that for the 10 public highway/rail grade crossings studied in Stanley County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.0053 to 0.031. This translates into a range of increase from 1 accident every 190 years to 1 accident every 32 years, respectively. SEA determined that the predicted increases resulting from the proposed rail traffic increase would be significant at the 7th Ave. (FRA ID No. 189858U, MP 484.10) and Main Ave.crossings (FRA ID No. 189861C, MP 484.60). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Stanley County is 0.166. This represents a predicted increase of 1 accident every 6 years in the County.

100 MNT

SEA's safety analysis showed that for the 10 public highway/rail grade crossings studied in Stanley County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.008 to 0.042. This translates into a range of increase from 1 accident every 124 years to 1 accident every 24 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at the 7th Ave. (FRA ID

No. 189858U, MP 484.10), Main Ave. (FRA ID No. 189861C, MP 484.60), and Second Ave. crossings (FRA ID No. 189860V, MP 484.50). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Stanley County is 0.024. This represents a predicted increase of 1 accident every 42 years in the County.

Jones County

<u>20 MNT</u>

SEA's safety analysis showed that for the 3 public highway/rail grade crossings studied in Jones County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.005. This translates into a range of increase from 1 accident every 292 years to 1 accident every 186 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jones County is 0.013. This represents a predicted increase of 1 accident every 78 years in the County.

<u>50 MNT</u>

SEA's safety analysis showed that for the 3 public highway/rail grade crossings studied in Jones County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.006 to 0.010. This translates into a range of increase from 1 accident every 162 years to 1 accident every 104 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jones County is 0.023. This represents a predicted increase of 1 accident every 44 years in the County.

<u>100 MNT</u>

SEA's safety analysis showed that for the 3 public highway/rail grade crossings studied in Jones County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.009 to 0.014. This translates into a range of increase from 1 accident every 106 years to 1 accident every 69 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jones County is 0.035. This represents a predicted increase of 1 accident every 29 years in the County.

Haakon County

20 MNT

SEA's safety analysis showed that for the 7 public highway/rail grade crossings studied in Haakon County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.002 to 0.015. This translates into a range of increase from 1 accident every 619 years to 1 accident every 68 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Haakon County is 0.054. This represents a predicted increase of 1 accident every 19 years in the County.

50 MNT

SEA's safety analysis showed that for the 7 public highway/rail grade crossings studied in Haakon County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.009 to 0.022. This translates into a range of increase from 1 accident every 108 years to 1 accident every 45 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Haakon County is 0.105. This represents a predicted increase of 1 accident every 10 years in the County.

100 MNT

SEA's safety analysis showed that for the 7 public highway/rail grade crossings studied in Haakon County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.007 to 0.030. This translates into a range of increase from 1 accident every

151 years to 1 accident every 34 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Haakon County is 0.125. This represents a predicted increase of 1 accident every 8 years in the County.

Jackson County

20 MNT

SEA's safety analysis showed that for the 6 public highway/rail grade crossings studied in Jackson County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.004 to 0.021. This translates into a range of increase from 1 accident every 245 years to 1 accident every 48 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic would be significant at crossing Highway 14 (190026Y, MP 571.80). This highway/rail grade crossing is classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jackson County is 0.048. This represents a predicted increase of 1 accident every 21 years in the County.

50 MNT

SEA's safety analysis showed that for the 6 public highway/rail grade crossings studied in Jackson County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.007 to 0.032. This translates into a range of increase from 1 accident every 152 years to 1 accident every 31 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at crossing Highway 14 (190026Y, MP 571.80). This highway/rail grade crossing is classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jackson County is 0.076. This represents a predicted increase of 1 accident every 13 years in the County.

100 MNT

SEA's safety analysis showed that for the 6 public highway/rail grade crossings studied in Jackson County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.010 to 0.044. This translates into a range of increase from 1 accident every 105 years to 1 accident every 23 years, respectively. SEA determined that the predicted increases resulting from the proposed construction were significant at crossing Highway 14 (FRA ID No. 190026Y, MP 571.80). This highway/rail grade crossing is classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Jackson County is 0.107. This represents a predicted increase of 1 accident every 9 years in the County.

Pennington County

20 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings along DM&E's existing rail line east of Wall in Pennington County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.013. This translates into a range of increase from 1 accident every 313 years to 1 accident every 76 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Pennington County is 0.025. This represents a predicted increase of 1 accident every 41 years in the County.

50 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings along DM&E's existing rail line west of Wall in Pennington County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.005 to 0.020. This translates into a range of increase from 1 accident every 193 years to 1 accident every 49 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Pennington County is 0.039. This represents a predicted increase of 1 accident every 26 years in the County.

100 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings along DM&E's existing rail line west of Wall in Pennington County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.008 to 0.028. This translates into a range of increase from 1 accident every 132 years to 1 accident every 36 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Pennington County is 0.054. This represents a predicted increase of 1 accident every 18 years in the County.

In summary, SEA determined that the proposed increased rail traffic would significantly increase the predicted accident risk in South Dakota at 14 public highway/rail grade crossings under the 20 MNT level of operation, 28 public highway/rail grade crossings under the 50 MNT level of operation, and 44 public highway/rail grade crossings under the 100 MNT level of operation. Many of these crossings would have significant increases in accident risk at all levels of rail operation. Additionally, many of these crossings are used by school buses numerous times each day.

Evaluation of grade crossings involves the potential for train/vehicle interactions. However, grade crossing safety impacts could also occur to pedestrians. Increased rail traffic would increase the likelihood of pedestrians encountering a train when attempting to cross the rail line. Because grade crossing warning and protection devices are designed for vehicles, they are not totally effective at preventing pedestrians from crossing rail lines. Initially, the increased frequency and speed of trains would be unfamiliar to pedestrians used to present train numbers and speeds. This could lead to potentially dangerous situations if they attempt to cross the tracks. At designated grade crossings or in the vicinity of them, horn soundings should provide warning to pedestrians, reducing the potential hazard.

It is likely pedestrians currently cross the rail line at various points that are not established grade crossings and where no crossing protection would be in place. Trains would not typically sound warning horns at these locations. Pedestrians engaging in this type of crossing would also be unfamiliar initially with the new train frequencies and speed. Their presence in unauthorized areas could place them at risk of injury, as well as risk to the locomotive and its crew should it be required to make an emergency stop. Changes in the behavior of these individuals would be necessary to reduce the risk of potentially significant impacts.

Reconstruction of the existing DM&E rail line has the potential to have a dramatic impact on rail safety. DM&E currently has among the worst safety record in the rail industry as discussed in Chapter 1, with accident rates in 1995 and 1996 of 41.4 and 36 accidents per million rail miles (Tables 1-1 to 1-3). These rates are over 10 times the rate for Class 1 railroads during those same years. Following reconstruction, DM&E railroad would be expected to attain a level of safety comparable to other Class 1 railroads. DM&E's current average of 2-3 major and over a dozen lesser derailments per month would be reduced. Substantially improved safety, resulting in fewer derailments, less damage to cars, locomotives, rail track and bed, property, and reduced loss of shippers materials, would be expected.

Missouri River Bridge Impacts

Reconstruction of the existing bridge across the Missouri River or construction of a new bridge could cause safety concerns to boaters and pedestrians in the immediate area due to the potential risk of falling debris or reconstruction materials. Improvements in bridge construction would provide safer transport of goods across the Missouri River, with a reduced risk of derailment or accidents. Construction of a new bridge would allow for the reduction of curvature in the approach curves for the bridge which would enable an increase of train speeds. Following bridge construction, if the existing bridge is left in place due to being converted to another use, such as a bicycle/pedestrian bridge, boaters would be required to negotiate two bridges in close proximity. The presence of additional in-stream piers would increase the obstacles in the river, potentially increasing the potential for a boating accident. If removal of the existing bridge is required after completion of construction of a new bridge, the potential risks would be similar to those for construction.

4.3.13 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

Neither construction or operation of the proposed project would result in an increase in the types or amounts of hazardous materials currently transported by DM&E. However, following completion of the proposed reconstruction of the existing rail line, the benefits of increased rail safety would reduce the likelihood of an accident involving release of hazardous materials or contaminants. While the likelihood of such an incident is currently low due to the minimal quantities of such materials transported, this risk would be further reduced from an improved rail line.

Hazardous Materials Sites

SEA identified potential impacts to hazardous waste sites from reconstruction activities. Hazardous waste sites are places where releases of hazardous materials have been reported to local, state, or Federal authorities. Related environmental concerns include facilities licensed to treat, store, or dispose of hazardous materials, leaking underground storage tanks (LUSTs), and solid waste facilities and landfills (SWFs/LFs). During construction, earthmoving activities could expose contaminants to construction workers, nearby residents, and railway workers. Wildlife, vegetation, surface water, and groundwater may also be exposed to contamination during construction. Because specific site information for each identified site is not available, it is not possible to determine the potential impacts of construction on these sites. DM&E should coordinate with the EPA and the South Dakota Department of Environment and Natural Resources to obtain specific information on the extent of contamination in its existing right-of-way, whether reconstruction activities have the potential to impact the site, and any protective actions necessary to avoid disturbance to these sites during construction.

During project operation, no impacts should occur to existing hazardous material sites. There is the potential during railroad operations that a spill may occur during a derailment. However, this is very unlikely due to the expected reduction in derailments and the regulations regarding handling, storage, and disposal of hazardous materials.

4.3.14 ENERGY RESOURCES

Transportation of Energy Resources

The proposed project has the potential to significantly impact the transportation of energy resources. Upgrading of the existing DM&E rail line would result from DM&E successfully constructing a rail line extension into the PRB and obtaining contracts to transport coal from the basin to utilities throughout the upper Midwest. As discussed in Chapter 1, this would provide a more cost-effective transportation route for PRB coal. It would help alleviate service and congestion problems at the mines and within the PRB, making transportation of PRB coal for each of the rail carriers serving the basin more efficient and reliable. Energy provided by PRB coal would be available to the user at a more economical rate, higher reliability, and greater efficiency.

Utilization of Energy Resources

For many of the same reasons as discussed in the previous Section, the proposed project has the potential to significantly impact the utilization of energy resources. The shorter routes provided by the project would reduce the transportation costs for PRB coal, increasing the attractiveness for utilities to switch to this coal or increase their use of it. Use of PRB coal is expected to increase in the future, as shown in Table 1-5. The increased rail capacity provided by this project would allow the mines to meet production projections and reliably deliver the larger quantities of coal to users.

The shorter route provided by the proposed project would result in significant fuel savings. Based on mileages to specific power plants discussed in Chapter 2, the DM&E route could provide mileage savings of several hundred miles over the routes of other rail carriers. This would result in a potential savings of hundreds of thousands of gallons of diesel fuel annually, providing a much wiser use of this resource.

Improved utilization of energy resources could also occur at the mines. Mines would not be able to expand their present operations beyond the current permitted level. However, as discussed in Chapter 1, many of these mines do not currently meet these production levels, in part due to inadequate rail service. Operation of the proposed project may enable these mines to meet permitted production levels and supply larger quantities to utilities. PRB coal is more economical to mine than eastern coal due to the relatively shallow overlying layers of soil and the thickness of the coal seams. This results in lower quantities of energy, such as diesel fuel and electricity, required to operate mining equipment necessary to extract, store, and load the coal. Increased utilization of PRB coal would also make more efficient use of that energy necessary to provide coal to the users.

Recyclable Commodities

Rebuilding of the existing DM&E rail line would require removal of hundreds of miles of rail, railroad ties, bridge materials, and tons of ballast and other rail bed material. Due to its age, most of the rail would likely be unsuitable for reuse and would be sold for scrap. Ties and wooden bridge materials could be sold for landscaping or other uses; although most would be in such poor shape they would be unmarketable. DM&E could potentially sell or give the ties to electrical utilities currently using ties as a fuel source for electric generation. However, large quantities may require disposal in landfills. Steel bridge materials which could not be used to upgrade bridges would be sold for scrap. Stone materials in some bridges and culverts may be used in railroad landscaping or sold for that purpose. Unmarketable materials could be used for aggregate, or placed in a landfill. Ballast and other rail bed material no longer suitable for rail operations could be used as fill material or aggregate for other projects such as roadways.

Reconstruction of the existing rail line would not only generate large volumes of recyclable materials, but would also generate a potential market for them. Rail and ties generated by other rail carrier's construction projects could generate suitable materials for use by DM&E.

Although these materials would likely be unsuitable for the rail line, they may be usable as part of yard and industrial sidings, spur rail lines to serve existing shippers, and provide temporary materials for construction. During operation, these materials would be replaced as new materials became available.

DM&E currently transports only limited amounts of recyclable commodities. These include less than 100 carloads annually of scrap steel. Operation of the reconstructed rail line would provide an improved rail line over which to transport these commodities.

4.3.15 CULTURAL RESOURCES

Impacts to cultural resources would occur if important archaeological or historic sites or structures which could substantially add to the scientific understanding of human occupation of the project area are damaged or destroyed during rail line reconstruction. Encountering and affecting cultural resource sites would be most likely in those areas where rail bed work would require earthmoving or excavation activities. However, confining reconstruction activities to the existing rail line right-of-way would minimize the area of disturbance, reducing the likelihood of encountering cultural resources. Much of the land within the existing rail line right-of-way was disturbed during rail line construction and any archaeological resources it contained were damaged or destroyed. However, SEA's investigation of recorded cultural resources sites within the existing right-of-way determined undisturbed areas are present within the right-of-way. These areas would be most likely to contain undisturbed cultural resources. If earthmoving activities to repair the existing rail bed or construct sidings are required in these areas, cultural resources would be at risk damage.

The project area has a rich and long history of human occupation and known sites of archaeological significance, including sites of significant importance to Native Americans, occur throughout the project area and along the existing rail line. Archaeological sites could be revealed during reconstruction and excavation for any of the alternatives and would offer the opportunity to recover the artifacts they contain. However, should unknown grave sites be encountered, and some are known to occur within the existing right-of-way, the artifacts and remains they contain could be damaged or destroyed. Any type of disturbance to prehistoric graves would be considered a significant adverse impact by Native American Tribes. Damage or destruction of significant archaeological or historic sites would be considered by SEA to be a significant impact, as would any disturbance to grave sites.

Eleven archaeological sites are known within or immediately adjacent to the existing DM&E rail line right-of-way in South Dakota. Five of these sites are considered eligible for listing on the National Register of Historic Places (NRHP) (Table 4.1-26). Of the eligible sites, four of the sites are prehistoric and 1 is historic. The historic site is outside the right-of-way and will not be affected by the project unless additional right-of-way is required. All of the prehistoric sites could be adversely affected by the project if the rail bed would require replacement, or if the construction methods would impact areas outside the existing rail bed. It is expected that some of the archaeological sites may be eligible for the NRHP as TCP's.[15] Any actions taken concerning these sites would be in accordance with the Memorandum of Agreement (MOA) [16] and Programmatic Agreement (PA).[17]

There are 239 bridges and culverts (including 64 iron and steel bridges and stone box culverts, 148 open deck timber pile spans, and one cast concrete slab) along the existing rail line. Bridge No. 1500, the existing bridge over the Missouri River, is listed on the NRHP. This bridge is discussed further below. Additionally, there are seven buildings that were identified (two are listed in the NRHP). There are 191 bridges that are recommended eligible for the NRHP. The portion of the DM&E rail line from Winona, Minnesota to Wasta, South Dakota could be eligible for NRHP listing as a linear historic district.

Replacement or extensive modification of NRHP eligible bridges and culverts would result in an adverse impact to historic resources. Removal or modification of historic structures could also result in an adverse impact. Reconstruction of the existing rail line could result in it no longer being eligible as a linear historic district. Because of the number of potentially eligible structures and the potential of the project to be a linear historic district, the impacts to historic resources from reconstruction of the existing rail line could be significant on cultural resources.

[15] A Traditional Cultural Property can be defined generally as 1 that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in the community's history, and (b) are important in maintaining the continuing cultural identity of the community. Examples include: 1) a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world; 2) a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural roles or practice; 3) a location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity (includes collection of medicinal plants).

[16] A Memorandum of Agreement means the document that records the terms and conditions agreed upon. In this case the Memorandum of Agreement is between the Federal agencies, the DM&E railroad, and the participating Tribes and tribal organizations. It is designated to address concerns that may be presented by construction of the Powder River Basin Extension Project.

[17] A Programmatic Agreement means a document that records the terms and conditions agreed upon to resolve the potential adverse effects of a Federal agency program, complex undertaking, or other situation.

During operation of the project, impacts to cultural and historic resources would primarily relate to increases in rail traffic along the existing rail line. However, rail traffic increases would have no impact on archaeological resources. Historic resources identified along the rail line were all developed as part of or in association with railroad activities. The operation of the project would not change the nature or context within which these structures are found. No impacts to historic or cultural resources are anticipated during operation of the rail line.

Missouri River Bridge Impacts

The existing railroad bridge spanning the Missouri River between Pierre and Ft. Pierre, South Dakota is listed on the NRHP. The bridge was constructed in 1906 with modifications made in 1927. Presently, it cannot be determined whether rehabilitation of the bridge would alter its status on the NRHP. If the nature and character of the existing bridge are retained, rehabilitation would not likely affect the historic status of the bridge. However, extensive modifications could make the existing bridge no longer eligible for listing.

Construction of a new bridge would not itself affect the historic status of the existing bridge, provided ownership of the existing bridge can be transferred and the bridge retained without major modifications. However, if ownership cannot be transferred, removal of the bridge would be required. Extensive modifications, loss of NRHP status, or removal would be considered a significant impact.

4.3.16 SOCIOECONOMIC

The following discusses those affects related to reconstruction of the existing rail line, as well as from the increased level of operation of the rail line upon various social and economic criteria. Socioeconomic impacts related to construction and operation of rail yards along the existing rail line in South Dakota are discussed in Section 4.10.

4.3.16.1 Population and Demographics

Short-term increases in population in all counties through which the existing rail line passes could be expected during reconstruction. While many of these would likely be filled by local workers, many workers specialized in rail reconstruction would likely relocate to the area. These workers would likely not locate permanently in the area, rather they would move to the area of the next project following completion of their work on this project. During reconstruction, non-local workers would likely locate in communities containing facilities such as lodging, groceries, and restaurants that are close to portions of the existing rail line they are involved in reconstructing. Non-local workers could also be expected to relocate during the reconstruction period to remain near the work area. This would be necessary to minimize travel times from lodging to work sites as DM&E has indicated reconstruction would proceed at approximately 1.0 mile per day. U.S. Highway 14 and I-90, both generally parallel the existing rail line, would provide easy access to the project area from points along the rail line, allowing local workers to retain their current residences and commute to the project site. Table 4.3-23 provides an estimate of the direct reconstruction jobs potentially requiring workers to relocate to the area.

Additionally, indirect jobs, both temporary and permanent, in the service areas (restaurants, convenience stores, bars, grocery stores, etc.) would likely increase throughout the area as the demand for these services increased with the influx of additional workers (Table 4.3-24). These jobs would also likely be filled locally. However, the amount of reconstruction activity and demand for other types of jobs may entice some individuals to relocate to the area seeking employment. This number would be small and likely occur in the larger communities along the rail line, such as Brookings, Huron, Pierre, and possibly Rapid City.

The counties in which the larger communities are located have varied population changes (Tables 4.1-27 and 4.3-24). Brookings County (Brookings) has seen an increase in population of over 7 percent, much more than the less than one percent increase anticipated as a result of this project. Beadle County (Huron) experienced a population decrease of 1.1 percent. The potential population increase of 4.5 percent would offset this loss and result in a population increase of approximately 3.4 percent.

Hughes County (Pierre) and adjacent Stanley County experienced a 4.4 percent increase and slightly less than 1.0 percent decrease in population, respectively. These compare to anticipated population growths of less than one percent for Hughes County and nearly eight percent (7.8 percent) for Stanley County. Hughes County should be able to easily accommodate the anticipated growth. However, Stanley County would experience a substantial percentage increase that could impact the county and its communities' ability to provide adequate services. In actuality, much of the anticipated growth in Stanley County would likely occur in Hughes County as Pierre is the only community of significant size in the region. Its larger size should help absorb the regional increase in population.

Of all of the counties anticipated to have a potential population increase of greater than two percent (Beadle, Hyde, Stanley, Jones, and Haakon), all but Stanley have experienced population declines greater than the anticipated increases. These counties should be able to absorb the temporary increase in population. Stanley County has experienced a minimal population decline but could experience a large increase as noted above. However, because facilities and services are limited or not available in the county due to its rural nature, portions of this increase could be expected to locate in adjacent counties, particularly Hughes. This diffusion of population would help reduce the strain on Stanley County. Additionally, since all the increase is anticipated for reconstruction, once reconstruction in and adjacent to Stanley County has been completed, reconstruction personnel would leave the county, returning the population to near pre-reconstruction levels. No significant permanent increase to the county population is anticipated. Therefore, none of the South Dakota counties should experience negative impacts due to increases in population during reconstruction. Table 4.3-24 provides a summary of the potential direct and indirect construction and permanent jobs associated with rail line reconstruction in South Dakota.

Table 4.3-24
Employment Compared to Population Statistics for Potentially Affected Counties - South Dakota

County	Reconstruction Employment		Permanent Employment (startup/full operation)[1]	Percent of County Population/County unemployed (1994)	Change in County Population (1986-1994)
	Direct	Indirect			
Brookings	62	30	50/116[2]	<1/2.7	7.20
Kingsbury	54	24	*	1.4/3.8	- 8.50
Beadle	158	69	250-300/600	4.5/2.6	- 1.10
Hand	46	21	*	1.6/2.4	- 10.40
Hyde	26	11	*	2.2/2.7	- 12.60
Hughes	86	38	*	<1/2.2	4.40
Stanley	144	64	*	7.8/3.2	- 0.90
Jones	32	14	*	3.5/3.2	- 12.80
Haakon	91	40	*	5.2/3.2	- 9.70
Jackson	23	10	*	1.1/5.1	15.10

* No permanent railroad related jobs are anticipated. However, indirect service jobs are likely to develop.

(1) Includes direct railroad jobs only.

(2) Assumes DM&E would keep its corporate headquarters in Brooking, South Dakota.

4.3.16.2 Employment and Income

Reconstruction is anticipated to take two to three years and would occur simultaneously in three states. Therefore, separate construction work forces would be required in each state. Approximately 1,246 direct construction-related jobs are anticipated in South Dakota, with a two-year duration (Table 4.3-24). These jobs would be spread throughout the State, with the total number of workers divided into numerous smaller crews responsible for a particular aspect of construction, such as rail bed preparation or rail placement, or completion of a particular geographic area of the project.

Construction jobs would require a wide range of workers and activities. More generalized jobs such as heavy equipment operators, carpenters, electricians, landscapers, truck drivers, and mechanics would likely be filled by local workers, contractors, and farmers during times between planting and harvest and during the winter. However, because of the number of workers required and the limited availability of workers in many less populated areas of the state, non-local workers may also be required to fill these positions. Additionally, many unskilled laborer or apprentice positions would also be available. More specialized workers, such as rail construction contractors, would likely be non-local. Such contractors in-state could be utilized. However, as these workers tend to be specialized in what they do and relocate from job to job, these positions would likely be filled by non-local and out-of-state workers.

In addition to direct reconstruction jobs, approximately 591 indirect jobs are anticipated to be generated by the proposed project (Table 4.3-24). These jobs would occur over the two-year reconstruction period and would likely continue for two to three years after reconstruction is completed. These jobs would result from the presence of workers, both local and non-local, that would be present during reconstruction. Local workers would have consistent income resulting in more money to spend locally on goods and services. They would continue to spend following completion of reconstruction, thus resulting in the two to three year post-reconstruction requirement for jobs. Non-local workers would spend portions of their income locally, increasing the demand for goods and services. Additionally, non-local workers would require lodging, using local hotels, motels, rental properties, and trailer and RV parks. All these economic sectors would be expected to increase in demand and value. Shortages, particularly during the summer tourist months, could occur, potentially resulting in increases in construction of hotels and other lodging facilities. Local residents may be able to rent rooms or entire homes to construction workers, supplementing their incomes. Goods and services, such as those provided by restaurants, convenience stores, gas stations, movie theaters, bars, bowling alleys, and grocery stores, would increase in demand due to the increased population from construction workers. New businesses such as these could be expected, resulting in additional construction activity, providing jobs for construction workers as well as to staff the new business. Table 4.3-25 provides estimates of construction related earning in the project counties. A portion of these earnings would be available to purchase goods and services from local business and provide tax revenues for the State and County.

Table 4.3-25
South Dakota Railroad Construction Earnings by County

County	Estimated Earnings ($)
Brookings	9,246,300
Kingsbury	7,434,200
Beadle	21,777,900
Hand	6,385,300
Hyde	3,494,800
Hughes	12,421,300
Stanley	19,922,700
Jones	4,321,300
Haakon	12,588,900
Jackson	3,112,400
Total	**91,458,800**

The population in the project area counties is over 80,000, with an average unemployment rate of 3.3 percent (Tables 4.1-28 to 4.1-30). At this rate, approximately 6,000 persons are unemployed, well over the number of local workers anticipated to be required during project construction. Although these persons may not have the skills for rail reconstruction, they would likely have some skill that could be used for employment in one or more of the many jobs created during reconstruction, including non-skilled laborer and apprentice positions, and jobs in service industries.

Workers in laborer and apprentice positions would have the opportunity to learn a skill or trade and obtain permanent employment in that field following completion of rail reconstruction. More skilled workers in many areas could be expected to seek employment at positions created by rail line reconstruction as higher wages would likely be paid for these jobs. This would create positions for less skilled employees as well as opportunities for persons seeking to learn new jobs.

Unemployment throughout the project area could be expected to decline. However, the demand for labor could result in competition for workers and thus higher wages and better benefits to attract qualified employees. This seems likely, due to the low unemployment within the region.

Additionally, easy access throughout the project area is provided by U.S. Highway 14 and I-90. Persons throughout the area could be expected to travel some distance for opportunities at higher wages for jobs related to rail line reconstruction. Additionally, the attractiveness of many good paying jobs in the area may result in non-local workers or those unemployed relocating in the area in order to seek employment.

While unemployment within the project area counties is relatively low, averaging approximately 3.3 percent, in several adjacent counties it is much higher, particularly where all or much of the county is within the boundary of a Native American Reservation. These counties include Dewey and Ziebach (Cheyenne River Reservation), Shannon and Jackson (Pine Ridge Reservation), Todd (Rosebud Reservation), and Buffalo (Crow Creek Reservation). Table 4.3-26 summarizes the unemployment statistics for these counties. Unemployment rates for Lyman, Hughes, and Hyde counties are also included as these counties also contain reservation land associated with the Lower Brule and Crow Creek Reservations. High unemployment in these counties reflects a high unemployment rate among Native Americans living on Reservations. While the Rosebud and Cheyenne River Reservations are not in close proximity to the reconstruction area, the Reservations provide a potential labor force within a reasonable distance, particularly if DM&E elects to use mancamps in the western areas of South Dakota. During operation, high paying permanent jobs near Huron and Wall would likely be close to several reservations such that residents unwilling to relocate off the reservation may be willing to commute the distance to work. This project would then provide needed employment opportunities to these areas and allow DM&E to utilize a larger percentage of local labor.

Table 4.3-26
Unemployment Statistics for Counties containing Reservations near the Project Area

County	Percent Unemployed (1997)
Buffalo	13.2
Dewey	12.1
Hughes	2.6
Hyde	3.4

Table 4.3-26 Unemployment Statistics for Counties containing Reservations near the Project Area	
County	**Percent Unemployed (1997)**
Jackson	5.5
Lyman	5.4
Shannon	12.0
Todd	8.8
Ziebach	10.1
Average	**8.1**
*Based on 1994 data.	

DM&E would likely acquire a variety of construction materials and supplies within the immediate and adjacent project area. These could include concrete, steel, ties, rail, ballast rock, fill, subgrade and subballast material, fencing, lumber, and a variety of other materials. It would be preferable to acquire these locally due to increased costs associated with importing materials. While it is likely many materials would not be available locally, many local businesses would be able to provide what materials they could. These would include commercial gravel, rock, and sand quarry operations, hardware stores, lumber yards, ready mix plants, and other construction related material dealers. Providers of these materials could expect increases in sales during the construction period.

Potential project impacts to employment and income are expected to be beneficial and potentially significant, particularly during reconstruction. Employment opportunities are expected to increase and unemployment decrease throughout the area. Lower unemployment would increase the demand for workers, potentially resulting in higher wages and better benefits being offered to attract qualified persons. Following reconstruction, additional high-paying railroad jobs would continue to benefit the labor market by providing high-paying jobs within the area.

4.3.16.3 Public Services and Fiscal Condition

Counties are able to fund a variety of services by collecting property and other taxes. As part of the proposed project, all the area counties should receive additional tax revenues. These revenues would result from new railroad facilities being constructed, existing facilities upgraded, and increased spending by construction workers and additional permanently employed individuals within the county. Table 4.3-27 provides an estimate of the sales and use taxes generated in each county during project construction due to purchases of materials for construction and spending by construction workers for goods and services. A portion of these taxes would be available to the county.

Table 4.3-27
Sales and Use Taxes Generated by County - South Dakota

County	**Taxes ($)**
Brookings	1,072,800
Kingsbury	975,000
Beadle	2,142,700
Hand	826,200
Hyde	464,200
Hughes	1,436,500
Stanley	1,934,800
Jones	512,900
Haakon	1,416,900
Jackson	388,500
Total	11,170,500

Additionally, DM&E would pay property taxes on its facilities. These taxes would vary between counties, depending on the actual facilities located in the county and the county's tax assessment rates. Table 4.3-28 provides an estimate of the property taxes DM&E would pay each year under the 40MNT and 100 MNT operating scenarios.[18] These amounts are compared to the taxes DM&E paid in 1997 and the total taxes collected by the counties in 1997 (Table 4.1-31 also provides information on total taxes collected in 1998. However, for consistent comparison, those amounts are not included here).

Table 4.3-28
Comparison of Property Taxes Paid and Anticipated for the Proposed Project

County	DM&E 1997 Taxes Paid ($)	Taxes assesse at 40 MNT ($)	Taxes assessed at 100 MNT ($)	Total Taxes Collected 1997 ($)
Brookings	2,136	1,125,600	1,369,500	17,667,412
Kingsbury	1,615	1,113,200	1,354,500	1,064,307
Beadle	6,760	1,251,600	1,522,900	14,199,907
Hand	1,147	943,900	1,148,600	4,173,086
Hyde	908	562,500	684,400	1,881,410
Hughes	2,372	1,284,400	1,562,900	11,841,751
Stanley	0	343,400	417,900	2,764,032
Jones	234	429,900	523,100	1,422,769
Haakon	914	1,041,000	1,266,700	2,317,204
Jackson	0	343,400	417,900	1,577,426
Total	**16,086**	**8,438,900**	**10,268,400**	**58,909,304**

[18] The 40 MNT and 100 MNT levels are both included as the increase in operations would require construction of additional facilities that would increase the value of DM&E property within each county. Because the level of operation would be subject to the market, both of these levels are presented for comparison. The 20 MNT level of operation was not presented in the economic report prepared for the project and is not presented. This level of traffic would occur at project startup and is anticipated to only occur for a short time before operating levels increase. Therefore, 40 MNT and 100 MNT likely are a more accurate reflection of the potential long term tax impacts.

Property taxes under the proposed project would increase substantially over those currently assessed for DM&E. This additional revenue would contribute significant additional funds to each of the counties. These funds would enable the counties to continue to provide their current services, possibly enabling them to upgrade or increase what they are able to provide due to this increase in revenue being accompanied by little permanent increase in population or change in county responsibility. Any increase in county population due to the project should easily be accommodated by the increased revenues generated by the project.

Overall, the project should have a beneficial impact on the services offered by the counties and the counties' fiscal conditions. Increased tax revenues should easily offset any additional financial burden the project may cause the counties while still providing additional revenues for county services.

4.3.17 ENVIRONMENTAL JUSTICE

Nine census block groups in South Dakota along the existing DM&E rail line were determined by SEA to meet the criteria for classification as environmental justice.[19] These census block groups include one each in Brookings, Beadle, Hyde and Jones Counties, and five in Hughes County. The census block groups in Brookings and Hyde Counties occurred outside any established community. All of the census block groups in Hughes County are within the town of Pierre, Huron for the single census block group in Beadle County, and Capa for the census block group in Jones County. All but one census block group, located in Hughes County, were classified as environmental justice due to having a percentage of persons in the census block group at or below the poverty level that was 10 percent or more than the percentage for the county in which the census block group was located. The one remaining census block group in Hughes County was classified as environmental justice due to over 50 percent of the population of the census block group being considered low income. In addition, one census block group in Hughes County meeting the 10 percent criteria for low income also had a percentage of minority that was more than 10 percent higher than the overall percentage of minority in Hughes County.

SEA evaluated the impacts of the proposed increases in rail traffic to these environmental justice census block groups and compared these impacts to the impacts expected to non-environmental justice census block groups. SEA's analysis determined that the census block groups in Brookings and Beadle Counties would experience disproportionate impacts due to increased noise. Disproportionate impacts would occur at all levels of operation (20 MNT, 50

[19] Nine additional census block groups in Brookings County were identified by SEA as meeting the criteria for classification as environmental justice communities. These census block groups are all located within the town of Brookings and are discussed as part of the evaluation of the proposed Brookings Alternatives in Section 4.9.

MNT, and 100 MNT) for the Beadle County census block group and at the 50 MNT and 100 MNT levels for the Brookings census block group.

In addition, SEA determined one census block group in Hughes County would be disproportionately impacted for grade crossing safety due to a grade crossing (Harrison Street, FRA ID No. 189844L, MP 480.5) within the census block being determined to experience an increase in accident frequency meeting SEA's criteria for significant impact. These impacts would occur at the 20 MNT, 50 MNT, and 100 MNT levels of rail traffic. Also, SEA determined one census block group in Brookings County would be disproportionately impacted for grade crossing safety due to a grade crossing (459th Street/Co. Rd. 1, FRA ID No. 197448R, MP 302.8) within the census block being determined to experience an increase accident frequency meeting SEA's criteria for significant impact. These impacts would occur at the 50 MNT and 100 MNT levels of rail traffic.

SEA also analyzed census block groups to determine if any environmental census block groups would be disproportionately impacted by the proposed rail line reconstruction and increased levels of operation due to being adversely impacted by more than one evaluation criteria (noise, safety, air, transportation, etc). SEA's analysis did not identify any environmental justice census block groups that would be adversely impacted by more than one evaluation criteria. Therefore, no disproportionate impacts would be borne by environmental justice communities due to being adversely affected by multiple impact categories.

4.3.18 RECREATION

A wide variety of recreational opportunities are available within the project area, as discussed in Section 4.1.15.1. Although a wide variety of opportunities are available, these opportunities are only capable of accommodating small numbers of people at any given time due to their size or limited available facilities. Many of the recreational opportunities common to the project area are outdoor oriented such as hunting, fishing, camping, snowmobiling, biking, and hiking.

During reconstruction of the existing rail line, outdoor recreation activities immediately adjacent to the rail line could be negatively impacted by reconstruction noise, human activity, fugitive dust, and increased vehicle traffic. These impacts would likely detract from the overall solitude of the area, reducing the enjoyment of the recreational experience. During off-days, reconstruction workers may take advantage of nearby opportunities, leading to increased use and possibly crowding. Regular users and tourists may experience frustration at larger than normal crowds and reconstruction related disturbance. Recreational activities subject to such disturbance would likely experience a decline during the period of reconstruction.

When occurring in close proximity to the existing DM&E rail line, outdoor recreational activities such as hunting, fishing, hiking, camping, and bike riding could be impacted by increased noise from the additional rail traffic projected to occur under operation of the rail line. Noise increases could detract from the overall solitude of the area and reduce the enjoyment of the recreational experience. Noise may disturb game immediately adjacent to the rail line, potentially reducing its availability to hunters. Impacts to fishing may include noise disturbance, increased roadway congestion, and water quality degradation during reconstruction. However, if hunting and fishing success in areas close to the rail line is good, some participants would be expected to return to these locations.

Impacts to hikers and bikers using parks and trails would include noise disturbance, reduced safety where crossings of the rail line would be required, and potential road congestion to access these areas. Impacts to trail users would occur primarily at and in close proximity to locations where trails cross the rail line. Snowmobilers should experience little impact with the exception of potentially reduced safety when crossing the rail line. Noise from snowmobiles would shield the user from train noise. Therefore, train noise would have no impact on the recreational experience of snowmobilers.

At established recreational areas and state parks, operation of the railroad could increase park noise levels. Park users would avoid parts of the park impacted by noise, seeking solitude in more distant areas of the parks. This could result in crowding and competition for these areas. Traffic delays on roads may also detract from the recreational experience. Safety issues may arise from the presence of unit coal trains operating in close proximity to public use areas at high speeds and across access roads. Campers would likely experience disturbance from night train operations, interrupting sleep and the camping experience. This could reduce revenues at parks and in the local communities dependent on recreational dollars.

DM&E indicated in its Application to the Board that it intends to develop a tourism passenger excursion train. This service would be designed to provide tourism and recreational opportunities along the rail line by providing interested persons, particularly "railroad buffs," the opportunity to take a ride on a train. DM&E does not have specific plans in mind but has indicted considering such things as dinner trips, wildlife viewing trips, and transport to the Black Hills region from communities at the eastern end of its system. No regular service, suitable for commuters would be provided. The service would be designed solely to provide a recreational experience for the rider.

Overall, impacts to recreation are expected to be localized and restricted to individuals using opportunities near the rail line. Currently, existing rail operations expose recreation to impacts similar to those expected to increase during operation of the proposed project. Impacts would be related to an individuals perception of the recreational experience along the rail line. It is expected that during operation of the project, recreation could be significantly impacted for certain individuals. However, abundant recreational opportunities exist throughout the South Dakota project area. This would allow any displaced recreational users the opportunity to utilize other areas and facilities. For the most part, the proposed project would only have minimal impacts to recreation. However, to a small number of individuals, the impacts could be significant.

Missouri River Bridge

The reinforcement option for the existing bridge over the Missouri River would require the reconfiguration of the multi-purpose recreation trail that passes under the bridge along the river. Reinforcement activities would require the trail being moved so that users can safely utilize this segment of the trail. Trail closure during realignment would prevent use of the trail portions near the bridge. Construction related congestion, equipment, activities, and noise would detract from use of the trail for the period of time for bridge reinforcement, lasting two to three years. The trail would be permanently changed to a new trail configuration. Increased train traffic on the bridge would result in increased noise disturbance to trail users during train passing events. It is possible that a number of users would find the increased use of the tracks unacceptable, and would switch to a different trail in the area. Because public land would be affected, reinforcement of the Missouri River bridge would likely require the completion of a Section 4(f) Statement in accordance with the Transportation Act of 1966 which discourages any U.S. Department of Transportation agency, in this case the Coast Guard, from using publicly owned park land unless no feasible alternative is present and all possible planning to minimize harm to the land is included in the action.

The site of the bridge crossing the Missouri River is located in a portion of the river comprising Lake Sharpe. The lake was observed by SEA to be a popular boating area, and the site of the bridge itself popular for fishing. Reinforcement activities to the existing bridge would likely require closure of areas of the lake around the bridge to boating traffic. Fishing or other activities immediately under or around the bridge would be restricted for boater safety. Closures of bank areas would also likely occur, preventing bank fishing under and around the bridge. Following completion of bridge work, restrictions would be lifted and previous activities and patterns of use restored. No impacts would be anticipated to boating or fishing during operation, except that fishermen may be disturbed or distracted during a passing train.

The second option for the Missouri River bridge would be construction of a new bridge immediately upstream of the existing bridge. Recreational impacts from construction of a new bridge would be similar to those expected with reinforcement of the existing bridge. However, as new bridge construction would require more extensive in-river work and installation of several new piers, more extensive closures or restrictions could be necessary than for bridge reinforcement. Following bridge construction, if the existing bridge is left in place due to being converted to another use, such as a bicycle/pedestrian bridge, boaters would be required to negotiate two bridges in close proximity. The presence of additional in-stream piers would increase the obstacles in the river, potentially increasing the potential for a boating accidents. Additional piers would also provide additional structure for fish and areas for fishing boats to congregate pursuing opportunities for fishing locations. If the existing bridge would not be acquired, Coast Guard regulations would require it be removed so as not to provide any navigation hazard. This would remove the existing piers as potential boating obstacles. Any debris falling into the river during bridge demolition or dismantling would provide fish structure and areas for fishermen to orient.

4.3.19 AESTHETICS

4.3.19.1 Visual Resources

The reconstruction activities would cause construction-related visual impacts. Visual impacts would be restricted to the existing rail line right-of-way and would include ground disturbance, vegetation clearing, and the presence of heavy equipment. Although the rail line does not pass through any designated scenic areas or viewsheds, the flat topography would make disturbance visible for an extended distance. Most impacts to visibility would be observed at grade crossings. In these areas construction would be similar to that of road construction. No significant visual impacts would result from reconstruction of the existing rail line.

Impacts to the scenic nature of the area may result from the installation of new rail structures such as bridges, culverts, rail, ties, and ballast. Clearing of vegetation would make these structures more visible. Until some degree of weathering occurs, dulling the appearance of new materials, they would continue to be visible. However, the existing rail line has been in place for over 100 years, and other rail lines are located in the project area. The reconstructed rail line is not anticipated to significantly differ in appearance from the existing rail line. Therefore, no major impacts to visibility are anticipated due to the operation of the reconstructed rail line.

There are no designated wild or scenic rivers crossed by the existing rail line in South Dakota. None would be impacted by this component of the project.

Missouri River Bridge

Ground disturbance during rehabilitation or construction could disrupt the scenic view along the Missouri River, Lake Sharpe. Impacts associated with construction, such as the presence of large machinery and removal of vegetation would be similar to those presented above. Construction of a new bridge would add another structure across the river, which would change the character of the area. However, if the existing bridge is used for bicycle/pedestrian crossing, the availability of a new vantage point would be provided to those bridge users.

4.3.19.2 Nightlights

In the event that it would become necessary for construction crews to work during the dark hours of the day, the use of artificial lighting during the reconstruction phase of the project would result in light pollution impacts in the area. If near the rail line, reconstruction, security, or other associated lighting could disturb residents trying to sleep. Such lighting may be recognized by local residents as unusual but it is not anticipated to detract from the nature of the night environment as discussed in Section 4.4.20. Minimal impacts from lighting along the rail line would be expected as numerous sources of light currently occur along the existing rail line, any reconstruction lighting would move along the rail line as reconstruction proceeds, and would only occur at scattered locations over the two to three year construction period.

During rail line operation, the lights from passing trains during dark hours may have minor impacts on the people living near the rail line. However, any impacts would be restricted to those residents in close proximity to the rail line. Because train headlights would be directed down the rail line, impacts would be minimal and similar to those presently occurring. Any changes in nightlights resulting from reconstruction and operation would not significantly alter the night environment of the project area.

Missouri River Bridge

The proposed rebuild or new construction of the bridge over the Missouri River would involve placement of new lighting along the bridge. This increased light could cause some disturbance to residences located near the bridge. However, only a few residences are located in the area of the bridge and these are generally several hundred feet from the bridge. Safety lighting on the bridge should not affect these residences, particularly due to the numerous other sources of light in the Pierre/Fort Pierre area.

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4.4 SOUTH DAKOTA / WYOMING - NEW CONSTRUCTION

Approval of the proposed Powder River Basin (PRB) Expansion Project would include the construction of new rail line in South Dakota and Wyoming. The potential construction and operational impacts related to the new DM&E rail line as well as those associated with the No-Action Alternative, are discussed in this Section. They include those impacts anticipated to occur due to new construction in previously undisturbed areas as well as portions of the proposed Extension Alternatives that coincide with or parallel existing rail line. Alternative alignments are proposed for specific portions of the new construction alternatives and are designed to avoid environmentally sensitive areas. Information and descriptions relating to the potential impacts associated with construction and operation of each of these alternatives is presented in Sections 4.5 to 4.8. Alternative routing for Mine Loops is presented in Sections 4.7 and 4.8.

4.4.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would be denial by the Board of granting DM&E authority to construct a rail line extension into the PRB. The No-Action Alternative would result in no construction activities related to extending DM&E's existing rail line into the PRB and no impacts from the presence of an operating rail line. None of the following construction impacts associated with constructing the new rail line would occur:

- disruption to land uses,
- conversion of land to rail related facilities,
- disturbance to and erosion of soil,
- discovery and recovery, or possible damage or destruction of archaeological and paleontological resources,
- clearing of vegetation,
- disturbance to and loss of wildlife and their habitat,
- air emissions from construction vehicles and fugitive dust,
- increases in noise from construction equipment,
- disruption of traffic flow at grade crossings, and
- increased economic activity from construction workers.

The following operational impacts associated with rail transport of coal would not occur:

- increased noise levels, air emissions, and opportunities for vehicle delays at grade crossings, and concerns for train and vehicle safety along the existing rail line,
- improvement of DM&E's safety record due to upgrading its existing rail line,
- service and reliability improvements for existing shippers,

- inconvenience to ranchers and farmers whose lands are on both sides of the rail line,
- disturbance and mortality to wildlife and livestock from passing trains,
- increased noise levels disturbing residents and recreationists,
- increased air emissions from locomotives contributing to regional haze,
- vehicle delays at new or expanded grade crossings,
- potential for train/vehicle and train/pedestrian accidents at grade crossings, and
- additional jobs and tax revenues generated by increased railroad activity and improved railroad facilities

Although the No-Action Alternative would result in no changes to the existing environment, it is likely the No-Action Alternative would result in continued deterioration of DM&E's existing rail system. The present condition of the DM&E system impacts rail service efficiency and reliability, and both rail and vehicle safety, as evidenced by its safety record (Tables 1-1 to 1-3).

The Board, in its December 10, 1998 decision, indicated that absent the funds generated by DM&E's proposal, DM&E could cease to exist as a viable railroad. Because the No-Action Alternative would not result in DM&E accessing coal mines in the PRB, it would not achieve the same revenue gains associated with the build alternative. Moreover, it appears unlikely that another rail carrier would acquire the DM&E system given its deteriorated condition and limited revenue base. Therefore, rail service along the existing system could cease. The existing shippers along the rail line, accounting for approximately 60,000 rail cars per year, would lose rail service. Some shippers would be able to utilize trucks for transportation. Because one rail car transports the equivalent of 4 trucks, a significant number of additional trucks could be added to local roads. Other shippers would be unable to competitively convert to truck transport and would be required to relocate to areas with rail service or cease to operate. Many of these shippers include grain elevators serving the local agricultural communities. Loss of rail service and shippers would require local farmers to transport grain and other products greater distances for shipment, increasing operating costs for an already stressed agricultural economy. Increased reliance on trucks would increase air emissions from vehicles due to truck transport being less fuel efficient than rail. Wear on local roads would increase. Vehicle safety at grade crossings would not be an issue. However, increased levels of truck traffic would reduce the safety of area roads. Several hundred jobs in the project area associated with railroad operation and maintenance would be lost. Additionally, jobs provided by shippers forced to relocate or close would also be lost. Revenues generated to the counties through taxes and employee spending would be lost. Other business used by these employees would experience reductions in revenue. Loss of rail service throughout central and western South Dakota could result in a significant number of trucks being added to local roadways and economic hardship to those whose livelihood depends on the railroad, such as DM&E employees, shippers, and farmers.

4.4.2 INTRODUCTION - NEW CONSTRUCTION IMPACTS

The following discusses the potential impacts of each of the construction alternatives on the natural and human environment of the project area. New rail line construction would involve earthmoving and excavation within an acquired right-of-way[1] to create a suitable rail bed upon which rock ballast, rail, and ties would be installed. New bridges and culverts would be placed at stream crossings and new rail line would be installed over these structures. A detailed description of new rail construction is provided in Chapter 1.

4.4.3 CLIMATE

No impacts to the climate of the project area would result from any of the proposed new construction alternatives.

4.4.4 TOPOGRAPHY

Changes to the local topography along the proposed rail line could occur as a result of cut and fill activities, especially during construction of Alternatives B and C along the Cheyenne River. Numerous intermittent and perennial streams and a few rivers, including the Cheyenne River, would be crossed. A detailed discussion of the potential impacts to these waterways is found in Section 4.4.7.

4.4.5 GEOLOGY AND SOILS

4.4.5.1 Unique Geological Formations

Unique geologic formations are considered to be uncommon, unusual and or containing characteristics or qualities that make them of interest to science or the general public. Examples in the project area include the Badlands Formations in South Dakota and the Lance Formation in Wyoming. Alternative B would come the closest to unique geological formation of the Extension Alternatives. Alternative B would be constructed about 3,700 feet north of Badlands

[1] In its "Resource Technical Reports and Impact Assessment" for the proposed project, included as Appendix L, the USFS considered an average right-of-way width of 200 feet for all the Extension Alternatives. SEA determined that due to cut and fill requirements the average right-of-way width for Alternatives B and C would likely be greater than 200 feet. SEA therefore used an average right-of-way width of 400 feet for Alternatives B and C and 200 feet for Alternative D for its analysis in this Draft EIS when possible, to evaluate the potential impacts of the alternatives. However, for some resources, information supplied by the USFS provided the best available data. SEA used this data and has noted when a right-of-way other than 400 feet was the basis for the analysis.

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National Park at its closest point in Section 32, T43N, R46W (see Map Number 217, Volume VI, Appendix A). Because none of the alternatives would cross through the park or any of the types of unique geologic formations it contains, no impacts would occur to unique geologic formations.

4.4.5.2 Geologic Hazards

The principle geologic hazard in the project area would be landslides. Significant impacts due to geological hazards would occur if:

- Landslides or slumps result from project activities.
- Project facilities are damaged by landslides.

In South Dakota and Wyoming, portions of all the alternatives cross the Pierre Shale and Fort Union formations. These formations are highly susceptible to landslides (Radbruch-Hall *et al.* 1976). The clay-mineral content of these rocks is moderate to high, making them susceptible to slumps and earth flows. The weak and erodible rocks have generally low to moderate relief, with some buttes and badlands; slopes are generally moderate to steep along drainage courses. Areas that have a moderate to high incidence of landslides are confined mostly to the valley walls of the Cheyenne River and its major tributaries. In these areas, cutting or loading of slopes or unusually high precipitation may cause landsliding. Flatter areas are also susceptible to landslides if slopes are steepened by construction activities. The potential for slumping along Alternatives B and C where these alternatives are immediately adjacent to the Cheyenne River was observed by SEA on-site and is evident on high resolution aerial photos (scale of 1 inch to 200 feet).

To compare the potential landslide susceptibility of each alternative, SEA first determined the distance each alternative would cross the Pierre Shale and Fort Union formations. In addition, SEA identified soils mapping units that the NRCS lists as prone to slumping and landslides (based on their slope, landscape position, soil descriptions) (NRCS, 1982 and 1996). SEA quantified and compared these mapping units to determine the amount of potential landslide hazard for each alternative.

Potential impacts from slumps and landslides would depend on the size and location of the slump or landslide. Potential impacts could include land or habitat disturbance as well as introducing additional sediment into drainages that may reduce water quality and habitat for aquatic resources. Slumps and landslides could be a potential safety concern during rail line operation if a landslide caused a derailment or damaged the rail bed. In areas where slumps and landslides are common and occur naturally (including areas of bank erosion where slumps or creeps fall toward the Cheyenne River), construction may require wider right-of-way disturbance to construct a stable surface for the rail bed. Some activities that may be required to stabilize these areas could include excavating unstable material and reshaping slopes, providing positive drainage so that water drains away from the rail bed and away from potentially unstable slopes, and stabilization of river banks to reduce or eliminate undercutting.

Areas that are prone to slumping and landslides have been correlated to various soil mapping units. If construction triggered a landslide, the impact would be considered significant and long-term since landslides can be difficult to stabilize and can cause other significant environmental impacts such as habitat and water quality degradation. In addition, if slumps or landslides occur during operation, they could lead to rail bed instability, causing derailments and continued maintenance problems.

Alternative B (Proposed Action)

Alternative B would cross a total of 150.6 miles of the Pierre Shale and Fort Union formations. The potential for slumps or landslides would be high where this alternative would cross steep slopes or where cutting or loading of slopes or unusually high precipitation events may cause landslides. In South Dakota, approximately 40.8 miles (approximately 1,978.2 acres within the right-of-way) of the Pierre Shale Formation would be crossed. In Wyoming, 109.8 miles (approximately 5,323.6 acres within right-of-way) of the Pierre Shale and Fort Union formations would be crossed. In Wyoming, this alternative would not cross any known landslides (Larsen *et al.,* 1991a and 1991b), therefore the landslide potential along this alternative would likely be confined to those 40.8 miles in South Dakota where steep slopes adjacent to the Cheyenne River would be crossed.

Alternative C (Modified Proposed Action)

This alternative would cross a total of 135.0 miles of the Pierre Shale and Fort Union formations. As with Alternative B, the potential for slumps or landslides would be high where this alternative would cross steep slopes or where cutting or loading of slopes or unusually high precipitation events may cause landsliding in these formations. In South Dakota, 49.3 miles (approximately 2,390.3 acres within the right-of-way) of the Pierre Shale Formation would be crossed. In Wyoming, 85.7 miles (approximately 4,155.1 acres within the right-of-way) of the Fort Union and Pierre Shale formations would be crossed. In Wyoming, Alternative C would not cross any known landslides (Larsen *et al.*, 1991a and 1991b). The landslide potential along this alternative would likely be confined to the 49.3 miles in South Dakota where steep slopes adjacent to the Cheyenne River would be crossed.

Alternative D (Existing Corridors Alternative)

This alternative would cross a total of 164.2 miles of the Pierre Shale and Fort Union formations. In South Dakota, 69.9 miles (approximately 1,694.5 acres within the right-of-way) of the Pierre Shale Formation would be crossed and 94.3 miles (approximately 2,286.1 acres within the right-of-way) of the Fort Union and Pierre Shale formations would be crossed in Wyoming. Also in Wyoming, Alternative D would cross 2 very small areas where landslides have been reported (Larsen *et al*, 1991a and 1991b). One of these areas is located south of Newcastle in Sections 12 and 13, T. 4 S., R. 61 W.) in an area immediately east of the existing BNSF rail line. The other area is located northwest of Newcastle (Section 24, T. 2 S., R. 62 W.) and is also east of the existing BNSF railroad.

Alternative D would not be parallel to the Cheyenne River in South Dakota where steep slopes occur. Therefore, this alternative would cross the least amount of soils that have a high potential for slumps and landslides due to the lack of steep slopes occurring in the area. Only 2.1 miles (approximately 50.9 acres within the right-of-way) of those soils would be crossed in Wyoming.

4.4.5.3 Soil Impacts

Tables 4.1-2 and 4.2-2 list the soil groups that would be crossed by new construction. Potential impacts to soil resources would include:

- Loss of topsoil.
- Erosion, leading to soil loss and decreasing water quality.
- Loss of prime farmland soils through conversion to rail line right-of-way or from erosion.
- Introduction and establishment of noxious weeds from soil disturbance and disturbing or clearing existing vegetative cover.

With adequate mitigation measures to control erosion, prevention of topsoil loss, and control measures to prevent invasion of noxious weeds, impacts to most soil groups should be short-term, limited to the period of construction and revegetation. However, prime farmland soils within the right-of-way would be lost to agricultural production for the life of the project. Additional measures would need to be taken to ensure that compacted soils or soils that are difficult to reclaim are stabilized and revegetated as quickly as possible.

Alternative B (Proposed Action)

Construction would generally take place within the right-of-way acquired for the project. However, there would be extensive cuts and fills within this area to provide suitable grade for loaded coal trains. Right-of-way widths would range from 200 to approximately 600 feet for Alternative B, averaging approximately 400 feet. Based on this average right-of-way width and approximately 265.8 miles of new rail line construction, approximately 12,887.3 acres of soil would be disturbed during construction. This represents significant soil disturbance, exposing these areas to increased erosion. Alternative B would cross approximately 221.3 miles, (approximately 10,729.7 acres) of soils with a high erosion hazard (water, wind, or steep slopes).[2]

Alternative B would cross 20.9 miles (approximately 1,013.3 acres) of prime farmland in South Dakota. No prime farmland soils would be crossed by this alternative in Wyoming.

Soils in Pennington, Custer, and Fall River counties, South Dakota are prone to slumping and landslides. If slumps or landslides were to occur on these soils it would be considered a long-term impact because they can be difficult to stabilize. A total of 40.8 miles (approximately 1,978.2 acres) of these soil types would be crossed in these counties. Soil types in Wyoming are not prone to landslides or slumping along this alternative.

Alternative C (Modified Proposed Action)

Generally, Alternative C would have similar impacts as Alternative B. Extensive cuts and fills would be required for construction of this alternative with the right-of-way averaging approximately 400 feet. New construction of the 263.8-miles of new rail line for Alternative C would disturb approximately 12,790.3 acres of soil. While less than Alternative B, the soil disturbance for Alternative C would also be substantial. Alternative C would cross a total of approximately 208.2 miles of soils (approximately 10,094.5 acres) with a high erosion hazard in South Dakota and Wyoming.[3]

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[2] The total amount of soils with high erosion hazards represents the total length an alternative would cross of a soil type with a high hazard for erosion due to water, wind, or steepness. As a soil may have more than one of these hazards, the totals presented likely overestimate the total amount of such soils. However, they are presented as a comparison of the sensitivity of the soils crossed by each alternative to erosion.

[3] Ibid.

This alternative would cross 22.1 miles (approximately 1,071.5 acres) of prime farmland in South Dakota. No prime farmlands would be crossed by this alternative in Wyoming.

A total of 49.3 miles (approximately 2,390.3 acres) of soils prone to slumping and landslides would be crossed by Alternative C in South Dakota. No soils are prone to these hazards in Wyoming.

Alternative D (Existing Corridors Alternative)

Even though Alternative D is significantly longer than Alternatives B and C, it would be constructed within or adjacent to existing transportation corridors for much of its length. This would reduce the extent of cuts and fills required to establish the rail bed. The 233.2 miles of new rail line construction would have an average right-of-way width of approximately 200 feet, resulting in approximately 5653.3 acres of soil disturbance. Alternative D would have the least soil disturbance of the Extension Alternatives, but would also disturb a significant amount of soil. Alternative D would cross approximately 177.9 miles (4,312.7 acres) of soils with a high erosion hazard,[4] 49.8 miles (approximately 1,207.3 acres) in South Dakota and 128.1 miles (approximately 3,105.4 acres) in Wyoming.

A total of approximately 38.6 miles (approximately 935.7 acres) of prime farmland soil would be crossed by Alternative D. Approximately 37.6 miles (911.5 acres) of prime farmland would be crossed in South Dakota. Approximately 1.0 mile (24.2 acres) of prime farmland would be crossed in Wyoming.

Only 2.1 miles (approximately 50.9 acres) of soils that are prone to slumping and landslides are crossed in South Dakota and none in Wyoming, the fewest of all the alternatives.

4.4.5.4 Paleontological Resources

Impacts to paleontological resources would occur if important fossils, particularly vertebrate fossils, which could substantially add to scientific understanding of paleontological resources, are destroyed during project construction. There are world-famous paleontological deposits in the vicinity of all the Extension Alternatives. Fossils of dinosaurs and the ancestors of the modern day rhinoceros, horse, pig, and cat, early birds, reptiles, and invertebrates may be found in various strata which would be crossed by all of the Build-Alternatives. There are known paleontological sites adjacent to the alternatives and the possibility is high that paleontological

[4] Ibid.

resources of scientific significance could be disturbed or uncovered by earthmoving activities during construction of any of the Extension Alternatives.

Subsurface paleontological resources could be revealed during construction and excavation for any of the alternatives and would offer the opportunity to discover new specimens. Given the USFS and BLM standards and guidelines for protection of paleontological resources during construction, the possibility of irretrievably damaging a resource of scientific significance would be low on Federal lands. Because paleontological resources are not protected on private lands, scientifically significant specimens could be destroyed by any of the alternatives. The potential for loss of significant paleontological resources on private lands is therefore considered high, absent mitigation designed to protect these resources.

The USFS classifies an area's potential for containing paleontological resources as its Probable Fossil Yield Classification (PFYC). According to Beasley (1999), areas with a high potential for significant paleontological resources include all formations which have a PFYC rating of Class 3 or 5, with Class 5 being of highest potential. This classification is based largely on how likely a geologic unit is to produce vertebrate fossils of terrestrial (non-marine) origin. Because these classifications are based on geologic formations, they can also be determined on private lands adjacent to USFS lands. To quantify potential impacts to paleontological resources, crossing lengths through each PFYC (i.e., 3 and 5) are compared by alternative.

Alternative B (Proposed Action)

Alternative B would cross a total of 21.9 miles (approximately 1,061.8 acres) of formations with a PFYC of 5 in South Dakota. All of these formations occur on private lands. In Wyoming, the 7.3 miles (approximately 354.0 acres) of formations that have a PFYC of 5 all occur on Thunder Basin National Grasslands (TBNG). The remainder of Alternative B, approximately 230.6 miles (approximately 11,180.6 acres) of this alternative would cross formations that have a PFYC of 3.

Alternative B in Wyoming would cross approximately 2.0 miles (approximately 96.9 acres) of the 5,140 acre Thunder Basin Paleontological Special Interest Area (SIA) on the TBNG. This site is known to contain a high concentration of fossil remains from the late Cretaceous Period. This is the most productive fossil-bearing site on the TBNG. Standard stipulations and conditions of approval to construct through the SIA would reduce the potential for damage or destruction of paleontological resources. However, some inadvertent damage or destruction of paleontological resources could occur. Additionally, construction through this area could lead to the discovery and recovery of significant and important fossils, that, without this project may never have been discovered and available for science.

Alternative C (Modified Proposed Action)

Alternative C would cross a total of 37.9 miles (approximately 1,837.6 acres) of formations that have a PFYC value of 5. Of that total, 5.5 miles (approximately 266.7 acres) of the route would affect such rated formations in South Dakota. Of this South Dakota total, only 1.4 miles (approximately 67.9 acres) would be on Federal land, all of which is currently National Grassland. The remaining 32.4 miles (approximately 1,570.9 acres) would be in Wyoming with all of it being on private land. The remainder of Alternative C, approximately 209.9 miles (approximately 10,176.9 acres), would cross formations that have a PFYC of 3.

In Wyoming, this alternative would cross about 2.4 miles (approximately 116.4 acres) of the Thunder Basin Paleontological SIA, described above for Alternative B.

Alternative D (Existing Corridors Alternative)

This alternative would cross a total of 109.9 miles (approximately 2,664.2 acres) of formations with a PFYC of 5, the most of any alternative. In South Dakota, 56.5 miles (approximately 1,369.7 acres) of these geologic units would be crossed. In Wyoming this alternative would cross 53.4 miles (approximately 1,294.5 acres) with a PFYC of 5. Alternative D would cross 5.4 miles (approximately 130.9 acres) of these formations on the National Grasslands. This alternative would not cross the Thunder Basin Paleontological SIA. Because this alternative would cross the most formations with a PFYC value of 5 on private lands (104.5 miles, approximately 2,533.3 acres), it would have the greatest potential to significantly impact paleontological resources. Alternative D would also cross 189.3 miles (approximately 4,589.1 acres) of formations that have a PFYC of 3.

4.4.6 LAND USE

Impacts to land use would include:

- Degradation or preclusion of existing and legitimate land uses.
- Degradation of the enjoyment or value of adjacent property.
- Introduction of health risks, nuisances, or annoyances to areas where they did not previously exist.
- Loss of acres/animal use month (AUMs) within individual grazing allotments.
- Separating livestock from water sources either temporarily or permanently.
- Permanent obstruction of historic trails.
- Loss of cropland through conversion to rail line right-of-way or by making it unirigatable.

All the alternatives are expected to result in direct changes in current land use. This would occur through conversion of the existing land use to rail line right-of-way. Although this loss may be locally severe, on the overall landscape the loss would be relatively small.

Throughout South Dakota and Wyoming, the predominant direct land use conversions would occur in rangeland and cropland types. Impacts associated with conversion of these land use types are not anticipated to be significant and would amount to about 12 to 25 acres per linear mile of new railroad, depending on the right-of-way width required.

Noise and activities produced during construction, followed by railroad operation noise and activity would extend beyond the limits of the right-of-way corridor for all alternatives. Noise, human activity, and the presence of operating unit coal trains may degrade or preclude some existing land uses on adjacent lands (such as livestock grazing, recreation, and wildlife habitat).

4.4.6.1 Agricultural

4.4.6.1.1 Rangeland/Grazing

The primary impact to grazing resources would be the direct loss of forage area through its conversion to railroad right-of-way during construction. Other impacts associated with construction and operation of the rail line would include:

- fragmentation of grazing allotments and pastures due to the rail line bisecting allotments, allotment pastures, or pastures. Fragmentation resulting during construction would reduce allotment and pasture size which could affect the number or length of time livestock could be grazed. During rail line operation, additional time and effort would be required not only to move livestock from pasture to pasture more frequently but also to move them across an operating rail line.

- isolation of allotments or pastures from water sources, mineral licks, and improvements such as shelters, corrals, or windbreaks. These impacts could also occur from the rail line being constructed across allotments and pastures, resulting in water or other improvements being available on only one side of the rail line. Rail line fencing to prevent livestock from walking onto the rail line would prevent them from accessing the other side of the rail line where necessary resources would be available.

- disruption of ranching operations. Construction and operation of the rail line would likely interfer with the normal patterns of ranchers. Grazing rotations and patterns would need to be changed because some areas would be unavailable for grazing at the desired time due to construction activities. The presence of construction equipment, and trains during operation, would likely disturb livestock, particularly buffalo on those few ranches that raise them, making it difficult for ranchers to move livestock around construction equipment and the operating rail line. This disturbance would also cause livestock to avoid certain areas of the pasture, possibly even preferred or high-quality forage or watering areas, in an attempt to escape from the sights and sounds of construction and train operation. Over time, however, this avoidance may lessen as livestock become accustomed to operating trains. However, movement of livestock could still prove challenging.

- blocking of access to the allotments and disruption of livestock movements or trailing operations. Construction of the rail line would likely create allotments and pastures for which access is either not available without crossing the rail line or that requires inconvenient detours to access the area. As allotments and pastures are generally large, livestock using them have patterns of movement and use within the areas. Construction and operation of the rail line would create a barrier to some of these movements, possibly resulting in confusion and injury to livestock that may attempt to cross cattle guards or fences now in place along established paths. Additionally, ranchers have established patterns of trailing, or herding, livestock from one pasture to another. Often this is done on horseback. Less frequently, and much less efficiently, it is done by loading livestock into trailers or trucks for transport between pastures. New rail line construction would likely cross these established trails, preventing their use or increasing the difficulty of moving livestock over them due to the presence of the operating rail line. Some ranchers would likely be required to cease trailing livestock between pastures and resort to loading livestock, potentially several hundred individuals requiring numerous trips, onto trucks for transport to other areas.

- damage to range improvements. Construction of the rail line has the potential to damage or require removal of a variety of range improvements. These include windmills, water lines, watering tanks, ponds, corrals, barns and other outbuildings. Depending on construction requirements, such facilities that would be within the right-of-way would likely have to be removed or relocated.

- spread of noxious weeds. Disturbance to soil and existing vegetation during construction provides opportunities for establishment of noxious weeds. Noxious weeds include a variety of both native and introduced species that are of no forage value for livestock, may be harmful or poisonous to livestock if ingested, or may outcompete beneficial forage species reducing the available forage and number of livestock a pasture can support. During rail operation, bare-ground areas maintained for fire prevention may also provide areas for establishment of noxious weeds. While the right-of-way would be off-limits to livestock, noxious weeds within the right-of-way would provide a seed source that would likely lead to the spread of such weeds into adjacent pastures.

- increased loss of livestock from vehicle-livestock collisions during the construction phase and collisions with trains during the operational phase. During construction, increased traffic on local and farm roads would result in vehicle operators, potentially unfamiliar with livestock, encountering them while operating vehicles or equipment. The livestock too would likely be unfamiliar with the level of traffic or equipment, causing them to become confused. Potential injury or loss of livestock could result. During rail line operation, in the event livestock gain access to the right-of-way, such as through a damaged fence, they could be struck and injured or killed by a passing train.

- loss of forage due to fire. Cinders from carbon buildup in the exhaust system of locomotives periodically break loose and are blown out of the exhaust system along with other emissions. Locomotives are equipped with spark arrestors to prevent these cinders from being released. However, sometimes sparks or cinders escape. Under the right conditions, if these sparks land in an area with a fuel source such as dry grass, they can ignite grass fires. These fires can quickly be spread by the constant and often strong winds in the project area, resulting in the loss of large areas of rangeland forage. Additionally, sparks may be generated by rail car braking or maintenance activities such as welding. These sparks may also result in range fires under conditions where combustible materials and wind are available and come in contact with the spark. Volunteer fire departments, frequently formed from area ranchers, find it difficult controlling fires because of the vast expanse of territory involved, the speed at which the fire frequently moves, and the often limited access for equipment to the fire location.

Alternative B (Proposed Action)

Alternative B would cross approximately 231.6 miles of rangeland. In South Dakota, approximately 90.3 miles (approximately 4,378.2 acres) of rangeland would be converted to railroad right-of-way. In Wyoming, approximately 141.3 miles (approximately 6,850.9 acres) would be converted.

Alternative B would cross 22 USFS and 6 BLM grazing allotments or allotment pastures in South Dakota. Crossing these allotments would impact approximately 560.6 acres and result in the loss of 152.1 AUMs.[5] In Wyoming, 57 USFS and 4 BLM allotments would be crossed by this alternative. Alternative B would convert approximately 2,146.7 acres to rail line right-of-way and would result in the loss of 411.6 AUMs in Wyoming.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 207.0 miles of rangeland. In South Dakota, approximately 75.8 miles (approximately 3,673.2 acres) of rangelands would be converted to railroad right-of-way. In Wyoming, approximately 121.6 miles (approximately 5,895.7 acres) of rangeland would be lost.

In South Dakota, Alternative C would cross 13 USFS and 6 BLM grazing allotments. The total amount of allotment disturbance would be approximately 373.3 acres and result in the loss of 79.6 AUMs. In Wyoming, 43 USFS and 4 BLM allotments would be crossed by Alternative C. The total acres of allotment disturbance would be approximately 2,146.7 and result in the loss of 411.6 AUMs.

Alternative D (Existing Corridors Alternative)

Alternative D would cross 264.5 miles of rangeland. In South Dakota, a total 119.1 miles (approximately 2,887.2 acres) of rangeland would be converted to the railroad right-of-way. In Wyoming, a total of 145.4 miles (approximately 3,524.8 acres) of rangeland would be converted.

In South Dakota, 3 BLM allotments would be crossed. The total amount of allotment loss would be 32.4 acres and result in the loss 6.2 AUMs. No USFS allotments would be affected in South Dakota.

In Wyoming, 38 USFS and 6 BLM allotments would be crossed by Alternative D. The total amount of allotment loss would be approximately 1,287.6 acres, resulting in the loss of 231.9 AUMs.

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[5] Impacts to USFS and BLM allotments were calculated by the USFS and based on a 200-foot wide rail line right-of-way.

4.4.6.1.2 Cropland

Cropland composes a small but important land use throughout the project area. The importance of cropland is primarily in the hay, small grains, and other crops raised to provide feed for livestock, particularly during the winter months. Much of the cropland is found within the river valleys where a more dependable supply of water is available or soil moisture is sufficient to support crops. Croplands are often dependent on irrigation, either by movable sprinkler systems or flood irrigation systems, for dependable crop production.

Construction of a new rail grade across croplands would result in the conversion of cropland to rail line right-of-way. Any crops in the right-of-way would be lost during construction activities. Land within the right-of-way would no longer be available for agricultural production. The crossing of croplands would divide large fields into smaller ones, potentially creating problems to access certain fields, or portions of fields, or make them impractical or unprofitable to continue to farm. Construction activities also have the potential to damage irrigation structures and equipment.

During rail line operation, the new rail bed would create a levee across flood-irrigated fields. In such fields, water provided to a field would be unable to spread out over the entire field, only irrigating the portions on the side of the rail line where water would be applied. Moveable irrigation structures designed for large fields would require modification or replacement to function properly on the smaller fields or would cease to be usable. Portions of or entire previously irrigated fields could no longer be irrigable, resulting in lost productivity and crop revenue.

Fields that would continue to be farmed would have the added obstacle of an operating rail line adjacent to them. Farmers would be inconvenienced by having to move equipment across the rail line, potentially placing them in the path of operating trains at public grade crossings or at unimproved farm crossings. If access across the rail line is not readily available, farmers could be forced to move equipment significant distances on local roadways to reach their fields. Movement of large, slow moving farm equipment on public roads would create safety concerns for both farmers and the vehicles they would encounter.

Alternative B (Proposed Action)

Alternative B would cross approximately 23.7 miles of cropland. Approximately 16.0 miles (approximately 775.7 acres) of cropland would be crossed in South Dakota. Alternative B would cross approximately 7.7 miles (approximately 373.3 acres) in Wyoming.

Alternative C (Modified Preferred Alternative)

Alternative C would cross approximately 27.0 miles of cropland. Approximately 18.0 miles (approximately 872.7 acres) of cropland would be crossed in South Dakota. Alternative C would cross approximately 9.3 miles of cropland (approximately 450.9 acres) in Wyoming.

Alternative D (Existing Corridors Alternative)

Alternative D would cross approximately 50.4 miles of cropland. Approximately 42.3 miles (approximately 1,025.4 acres) of cropland would be crossed in South Dakota. Alternative D would cross 8.4 miles (approximately 203.6 acres) of cropland in Wyoming.

4.4.6.2 Residential

Residential land in the project area is limited to small, widely scattered areas associated with small towns or communities. However, construction activities through or near residential areas could result in temporary construction and longer term operational impacts. Such impacts would include noise and light disturbance to nearby residents during construction, safety hazards to children, increased traffic and congestion from construction equipment and vehicles, and fugitive dust. These impacts would be similar to those described in Section 4.3.6.2. In addition, construction of new rail line would require acquisition of new right-of-way, potentially requiring removal or relocation of residences as discussed below for each alternative.

Alternative B (Proposed Action)

Approximately 0.3 mile of residential land would be crossed by the proposed rail line. All this land would be in South Dakota and include the town of Smithwick. Through Smithwick, Alternative B would consist of the reconstruction of the existing DM&E rail line. As no additional right-of-way is anticipated for this portion of Alternative B, no residential land would be lost.

Alternative B would pass adjacent to an area of residential land at Edgemont. Although land classified as residential would not actually be crossed, construction and operation of a new rail line in close proximity to residential land would have similar impacts as those to residential land actually crossed. However, Edgemont is a small community through which an active BNSF rail line passes. Impacts from this project would be similar to those currently occurring to Edgemont residents. While no new impacts would be anticipated, the frequency of their occurance would be expected to increase with the addition of DM&E rail traffic.

No residential areas would be affected in Wyoming. However, the same type of impacts would be experienced by the scattered ranches within the project area.

Alternative C (Modified Preferred Alternative)

Because Alternative C follows the same alignment as Alternative B through Smithwick, Alternative C would also pass through the approximately 0.3 mile of residential land at Smithwick. No other residential land would be crossed by Alternative C. Additionally, Alternative C would be further (nearly a mile at its closest) from the residential areas at Edgemont and would therefore have only limited affect on them.

No residential land use areas are located along this alternative in Wyoming. However, there are scattered ranches that would experience the same type of impacts.

Alternative D (Existing Corridors Alternative)

Approximately 5.9 miles of residential land would be crossed by Alternative D. In South Dakota, this alternative would pass through several towns and communities, including Wall, Wasta, New Underwood, Box Elder (near Ellsworth Air Force Base), Rapid City, Hermosa, Fairburn, and Smithwick, comprising most of the 3.8 miles of residential land crossed in South Dakota. With the possible exception of Rapid City, Alternative D would involve reconstruction of DM&E's existing rail line through these communities. Reconstruction activities would be restricted to the existing DM&E right-of-way, resulting in no loss of residential land or the removal or relocation of residences. In Rapid City, some realignment of DM&E's existing rail line may be required due to current sharp curves. Realignment would likely require acquisition of new right-of-way and may require removal of some residences and businesses, particularly in the area where the existing rail line would turn south. Final design of this alternative, should it be approved, would be required to determine the exact impacts it would have in Rapid City.

In Wyoming, this alternative would pass through the residential communities of Newcastle, Osage, Upton, and Moorcroft. The majority of the 2.1 miles of residential land crossed by Alternative D in Wyoming would be through these communities. Acquisition of residential land, relocation, or removal of residences in these communities would be likely due to Alternative D paralleling the existing BNSF rail line through these communities. As residences currently occur along the BNSF rail line, insufficient land space is available for a second rail carrier to construct a new rail line. While DM&E may be able to reduce its right-of-way requirements through these areas to limit the amount of land required, it would likely be necessary to remove or relocate some residences.

4.4.6.3 Business and Industrial

As with residential land, business and industrial land is also widely scattered in the project area and generally restricted to small areas of the small towns and communities. During construction near businesses and industries, noise, traffic and construction congestion, and reduced access to patrons could inconvenience proprietors, employees, and patrons and affect the conducting of business. Following completion of construction activities in the vicinity of the business, these impacts would cease. Construction impacts would then be replaced with increased noise, traffic delays, reduced access, and grade crossing safety concerns from operating trains. Additional rail access could offer businesses and industries the opportunity to utilize rail for some of their transportation needs or encourage new facilities to locate along the rail line. Properties suitable for industrial development along the existing rail line would be expected to increase in value. These impacts are explained in more detail in Section 4.3.6.3.

Alternatives B and C would not cross any land identified as business or industrial. No impacts are expected to occur to these land uses during construction, as no businesses or industries are located in close proximity to the proposed rail line corridor. During rail line operation, the opportunity to obtain rail service may attract businesses to the area along these alternatives for future development. Property values may increase in areas suitable for commercial development.

Approximately 6.8 miles of business and industrial property would be crossed by Alternative D. Construction activities in or near these areas, found in Rapid City, Newcastle, and Moorcroft, would experience the temporary impacts related to inconvenience to employees and patrons from accessability problems, noise, dust, and congestion generated by construction equipment, vehicles, and workers. These impacts would be short-term, occurring only while construction is occurring in the vicinity of the business. Some temporary reductions in patronage may occur due to patrons selecting to do business at other establishments rather than cope with any construction related inconvenience. However, following construction, patrons would be expected to return. Other businesses, particularly those such as restaurants, convenience stores, and motels, may see an increase in patronage due to use by construction workers. Depending on final design and right-of-way requirements, it may be necessary to remove or relocate businesses or industrial facilities, particularly in Rapid City, Newcastle, and Moorcroft, due to their proximity to the existing DM&E or BNSF rail lines. In Rapid City particularly, the need to realign a sharp curve appeared to SEA to likely require the removal of one or more businesses to provide a reasonable curve for movement of unit coal trains.

Some businesses and industries located along Alternative D are currently provided with rail service by either DM&E or BNSF. Operation of Alternative D would provide an improved rail line and likely improved rail service to shippers along the existing DM&E rail line portion of Alternative D. Other potential rail shippers along this portion of the alternative may take advantage of the improved rail line and utilize rail for some of their transportation needs. Shippers along the existing BNSF portion of Alternative D would have two rail carriers to choose from, potentially enabling them to obtain better shipping rates or service. Expanded transportation options through the inclusion of rail service and a better ability to compete may enable these businesses and industries to increase their profit margins and expand their operations. The value of these operations would be increased, as well as the real estate they occupy. Additionally, efficient and competitive rail service along Alternative D may make the region attractive to new business and industry.

4.4.6.4 Minerals and Mining

The mineral resources in western South Dakota and eastern Wyoming are among the most productive in the United States. Construction and operation of the new railroad would likely have a positive impact on the mineral and mining industry in this area. Approximately 1.2 miles of these resources would be crossed by Alternative B. Alternative D would cross approximately 1.9 miles of mining and quarry lands. No mining or quarry land would be crossed by Alternative C.

Sand, Gravel and Rock

Sand and gravel is currently quarried throughout the project area. Much of the quarried material is used locally for roads and other projects. DM&E has indicated it plans to utilize local sources of sand and gravel for construction of the new rail line to the extent possible and practical. Local limestone and other rock may be suitable for ballast or other needs and would also be utilized. The utilization of locally quarried material for rail bed and rail line construction would result in fewer transportation impacts associated with shipping the material from distant locations, either by truck or rail. It would also provide an increased local market and demand for these materials. However, local increases in noise, dust, and truck traffic may occur from increased quarry activities. These impacts would be the same for each alternative. However, different quarry areas would potentially be utilized due to their location in relation to the alternative approved and whether the materials they contain are suitable for rail line construction.

In addition to rail line construction activities, an increase in sand, gravel, and rock demand may also occur as part of road construction and maintenance projects associated with rail line construction. Upgrading existing roads may be necessary to support rail line construction vehicles and equipment, requiring these types of materials. Additionally, existing roads may be closed and rerouted. New roads may also be necessary to provide access to construction areas. These projects would require materials from local quarries. In some cases, quarries with material unsuitable for rail line construction may be usable for these types of road projects, providing a demand and market for material in additional quarries.

Coal

As stated in Chapter 1, one of the purposes for the construction and operation of this project is to access the coal reserves in the PRB. A positive impact to the coal mining industry of the PRB is expected to occur as a result of DM&E gaining access to PRB coal mines. Each alternative would provide an additional rail carrier access to the regions coal mines, providing the opportunity for increase rail competition, leading to better transportation rates for PRB coal. Alternatives B and C would provide significantly shorter routes for rail transportation of coal to certain markets (Chapter 1, Section 1.3.2), potentially increasing the market for the regions coal. Because of its additional distance over Alternatives B and C, Alternative D may not necessarily provide a more efficient route for transport of PRB coal. However, the presence of an additional rail carrier, increasing rail competition could still make Alternative D attractive as a route for some shippers, encouraging them to start using or increase current use PRB coal. This would have a positive impact on PRB coal resources.

4.4.6.5 Federal Lands

4.4.6.5.1 Forest Service Lands

The vast majority of U.S. Forest Service (USFS) lands that would be crossed (including all lands on TBNG) are classified as roaded natural, rural or urban. An operating railroad would be compatible with these Recreation Opportunity Spectrum (ROS) designations (Section 4.1.4.6 and 4.2.4.6). However, semi-primitive motorized lands, which are present in South Dakota are expected to be predominately natural or natural appearing. The presence of a railroad would not be compatible with such a designation. Amendments to the current Forest Management Plans would be required. The proposed amendments are provided in Appendix L. Additionally, the presence of a rail line would impact USFS lands classified as RARE II or roadless (Sections 4.1.4.6 and 4.2.4.6). USFS lands used for rail line right-of-way would no longer be available for public use for recreation or leased for grazing due to safety concerns as presented in the Forest Service Resource Technical Report (Appendix L).

The National Forest Management Act (36 CFR Part 219.10(e)) requires consistency between any project being proposed and the national forest land and management plan (forest plan) for any forest or grassland being affected by the project. In this case, the USFS evaluated two existing forest plans for consistency between the proposed Extension Alternatives alternatives and forest plan standards and guidelines, as well as whether or not the proposed Extension Alternatives would be consistent with the desired future condition of the national forest system lands affected. The two forest plans evaluated were the Medicine Bow National Forest Land and Resource Management Plan, 1985, and the Nebraska National Forest Plan, 1984. The USFS determined that if an Action Alternative is selected, both of these forest plans will have to be amended because any Action Alternative will not, in many cases, be consistent with the management standards and guidelines of these forest plans. Therefore, a Forest Plan Amendment for both the Medicine Bow National Forest Plan and the Nebraska Forest Plan will be required before the USFS could issue a special use permit for the proposed project. These amendments are included in this analysis (Appendix L) for public comment and will become a part of the Forest Service Record of Decision.

Alternative B (Proposed Action)

Alternative B would cross approximately 51.9 miles of lands managed by the USFS as part of the National Grasslands. Approximately 16.3 miles (approximately 790.3 acres) of the Buffalo Gap National Grassland (BGNG) in South Dakota and 35.6 miles (approximately 1,726.1 acres) of the Thunder Basin National Grassland (TBNG) in Wyoming would be crossed.

Alternative B would be located within 500 feet of lands currently managed by BGNG as semi-primitive non-motorized. In the NE of Section 16, T4S, R11E., semi-primitive non-motorized USFS lands would be separated from Alternative B only by the Cheyenne River. Because of the rail line's close proximity to this area, it is likely that noise from construction and operation of a railroad and visual disturbance and intrusion from these activities along the Cheyenne River adjacent to an area with this Recreation Opportunity Spectrum (ROS) designation would degrade the recreation experience of those enjoying the area's wilderness-like qualities. Because there are no roads which would be crossed in this area, noise disturbance from locomotive whistles should not be a problem. However, locomotive and wayside train noise would likely cause disturbance to portions of these areas, degrading the recreational experience, including the feeling of isolated wilderness they provide visitors.

In South Dakota, two roadless areas would be crossed by Alternative B and a third would be separated from it by the Cheyenne River. All three of these roadless areas would be significantly affected by Alternative B. Alternative B would pass through the southeastern edge of the Red Shirt RARE II Area near the Village of Red Shirt. It would pass through the southern edge of the Cheyenne River RARE II Area. Alternative B would also cross the Red Shirt Inventoried Roadless Area. The crossings of these areas by the rail line would likely prohibit their current classification as roadless and require the USFS take measures to redesignate them as well as eliminate portions of both areas from future consideration for inclusion in the National Wilderness System. Indirect noise disturbance to the nearby Indian Creek RARE II Area would likely have a similar impact to this area.

On TBNG, this alternative would be adjacent (within approximately 200 feet of the rail centerline) to the H A Divide Inventoried Roadless Area. Like BGNG, the sights and sounds introduced into the area would significantly reduce the wilderness-like qualities of this area.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 38.9 miles (approximately 1,886.1 acres) of lands managed by the USFS as part of the National Grasslands. Approximately 6.1 miles (295.7 acres) of USFS land would be crossed in South Dakota, on the BGNG. The remaining 32.8 miles (1,590.3 acres) would be part of the TBNG in Wyoming.

Alternative C would not cross any lands designated as RARE II. Lands with the ROS designation of semi-primitive motorized lands would be crossed by Alternative C in the Spring Creek drainage area.

Although Alternative C does not cross any RARE II areas, it would be within 500 feet of the Red Shirt and Cheyenne River RARE II areas and the Red Shirt Roadless Area. Noise from the operating railroad, while not as severe as from Alternative B and impacting other portions of these areas, would be expected in these areas. Such noise impacts would be expected to degrade the wilderness qualities that make these areas potentially eligible for inclusion in the National Wilderness System.

Alternative D (Existing Transportation Corridor)

Alternative D would cross approximately 26.7 miles (approximately 647.3 acres) of USFS lands that are part of the TBNG. These lands would no longer be available for public use. No roadless or RARE II areas would be crossed by Alternative D.

4.4.6.5.2 Bureau of Land Management Lands

Lands managed by the BLM generally occur throughout the project area as small, isolated parcels. Their primarily use is as rangeland. Impacts to BLM lands would be similar to those described in Section 4.4.6.1, as well as removal of these lands from public use.

Alternative B (Proposed Action)

Alternative B would cross approximately 5.7 miles of lands managed by the BLM. In South Dakota, Alternative B would cross approximately 3.3 miles (approximately 160.0 acres) of BLM lands. In Wyoming, this alternative would cross 2.4 miles (approximately 116.4 acres) of BLM managed lands.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 4.9 miles of BLM lands. In South Dakota, Alternative C would cross approximately 3.4 miles (approximately 164.8 acres) and in Wyoming this alternative would cross approximately 1.5 miles (approximately 72.7 acres) of BLM lands.

Alternative D (Existing Transportation Corridor)

Alternative D would cross approximately 3.0 miles of BLM lands. In South Dakota, Alternative D would cross 1.3 miles (approximately 31.5 acres) of BLM lands. In Wyoming, it would cross approximately 1.7 miles (approximately 41.2 acres) of public lands. However, in Wyoming, Alternative D would cross BLM lands adjacent to an existing rail line. Impacts such as fragmentation of pastures, isolation of water sources, and displacement of livestock are not expected to be as significant as the other alternatives because only a narrow stretch of land would be lost to the additional rail line right-of-way.

4.4.6.5.3 Bureau of Reclamation Lands

Angustora Irrigation Project

Section 4.1.4.6.4 gives a detailed description of the Angustora Irrigation Project. No impacts are expected to occur to project lands or the Irrigation District as a result of construction and operation of Alternatives B, C or D. However, impacts to the Angustora Irrigation Project lands and Irrigation District would result from construction and operation of the WG Divide Alternative. These impacts are discussed in Section 4.6.

4.4.6.5.4 Fish and Wildlife Service Lands

No USFWS lands are crossed by any of the proposed Extension Alternatives. No impacts to USFWS lands would occur as a result of construction and operation of this portion of the proposed project.

4.4.6.5.5 U.S. Department of Energy Lands

Lands under management of the U.S. Department of Energy (DOE) would be crossed by Alternative B. Only Alternative B would cross DOE lands. Alternative B would cross approximately 0.3 mile (approximately 14.5 acres) of a portion of a 360-acre parcel of DOE land in Fall River County, approximately 2.5 miles southeast of Edgemont. This parcel is the former site of a uranium milling facility and tailing disposal. The site has been closed and cleaned up so as to no longer pose any threat. However, construction of a rail line across the site would require surface disturbance which is prohibited on this parcel. If Alternative B is selected, SEA would need to conduct consultation with DOE to determine if the parcel could be safely crossed, or a realignment of Alternative B would be necessary.

4.4.6.6 Reservation and Treaty Lands

No Native American Reservations would be crossed by any of the project alternatives. However, Alternative B would be between a few hundred feet and 0.5 mile from the Pine Ridge Reservation for approximately 13.6 miles. Construction activity, noise, and dust could be noticed on the Reservation. Erosion from the disturbed right-of-way and stream crossing of the Cheyenne River could reduce water quality in the Cheyenne River adjacent to the Reservation. The Cheyenne River is an important resource to Reservation inhabitants for water, fish, and recreation. Additionally, any contaminants spilled into the river during construction could reduce water quality for Reservation inhabitants.

During rail line operation, increased levels of noise from operating trains would be observed on the reservation adjacent to Alternative B, particularly at Red Shirt. Trains whistle sounding would be unnecessary along most of the Reservation due to the lack of roads. However, whistle sounding at State Highway 40 would be noticable by Red Shirt residents, although they would not be within any of SEA's calculated noise contours (Section 4.4.9). On calm nights, locomotive and wayside noise would also be noticable. Alternative B would also present concerns for water quality in the Cheyenne River should a spill of coal or hazardous materials into the river occur. The visual appearance of the areas across the Cheyenne River from the Reservation would also be permanently altered by the addition of a rail bed and operating railroad.

Rail line construction and operation would, however, provide employment opportunities for Native Americans living on the Reservation. The generally close location of Pine Ridge to all the Extension Alternatives would provide the opportunity for Native Americans to obtain temporary employment during construction and permanent jobs during operation while maintaining residency on the Reservation. DM&E has indicated it will work with Tribal representatives to provide opportunities for Native Americans, as indicated by its participation in the Memorandum of Agreement (MOA) between the Board, participating Tribes, and DM&E (Appendix I).

As noted in Section 4.1.4.7, the counties of Pennington, Custer, and Fall River are still considered by several Tribes to be the property of the Sioux Nation by treaty. These lands are currently held in ownership by the Federal government, State of South Dakota, or privately. All of the Extension Alternatives would cross these counties.

4.4.6.7 State Lands

Lands owned and managed by the states of South Dakota and Wyoming occur throughout the project area. While in other parts of South Dakota, state lands include GPAs and state parks, state lands along the Extension Alternatives are all leased to local ranchers for grazing. In Wyoming, state lands are also leased to ranchers for grazing. In some cases, access to these lands is restricted to the ranchers leasing the land. Others are open to the public.

Alternative B

Alternative B would cross approximately 10.1 miles of state land. It would cross approximately 2.7 miles (approximately 130.9 acres) of state land in South Dakota. Approximately 7.4 miles (358.8 acres) of state land would be crossed by Alternative B in Wyoming. All this land is used for grazing. Construction and operation of a rail line across these lands would have impacts similar to those described in Section 4.4.6.1.

Alternative C

Alternative C would cross approximately 11.7 miles of state land. It would cross approximately 2.1 miles (approximately 101.8 acres) of state land in South Dakota. Alternative C would cross approximately 9.6 miles (approximately 465.4 acres) of state land in Wyoming.

Alternative D

Alternative D would pass through or cross approximately 10.9 miles (approximately 264.2 acres) of state-owned land. In South Dakota, Alternative D would pass through approximately 2.0 miles of state land. These lands are currently adjacent to DM&E's existing right-of-way. This portion of DM&E's existing rail line would be rebuilt as part of Alternative D. SEA expects that additional right-of-way would be required along DM&E's existing rail line in order to optimize the alignment so that it would be suitable for unit coal trains. However, no determinations of how much additional right-of-way would be required at these locations has been prepared by DM&E. Therefore, while some loss of state land in South Dakota would be expected from Alternative D, the amount can only be estimated at this time, rather than precisely quantified. Alternative D would cross approximately 8.9 miles (approximately 215.7 acres) of state land in Wyoming.

4.4.6.8 Utility Corridors

Numerous utilities of all types would be crossed by the newly constructed rail line or utilized by new rail line right-of-way. Construction and operation of the new rail line would have the potential to damage these utilities, resulting in loss of product, customer service, and in the case of natural gas or petroleum products, create potentially dangerous situations. DM&E would need to identify all utilities within the new right-of-way and coordinate with the owners of those utilities to insure they are properly protected during reconstruction, and determine if they would require relocation or reconstruction to prevent future damage from rail operations. Provided this is done, the project would have no significant impacts on utilities.

4.4.7 WATER RESOURCES

Impacts to water resources would include:

- Construction runoff causing sedimentation in project area waterways.
- Disturbance of the stream corridor, resulting in erosion and sedimentation degrading water quality.
- Stream channel modifications resulting in changes to waterway hydrology.
- Impairment or destruction of groundwater supplies by construction of the alternatives, or contamination if spills of fuel or other hazardous materials occurr and enter the aquifer.
- Loss of wetlands and riparian communities.

4.4.7.1 Surface Water

Installation of bridges and culverts has the potential to increase erosion into surface waters and disturb bottom sediments. These impacts would result in increased total suspended solids (TSS) in surface waters, increasing stream sedimentation, changing sediment loading and depositon patterns in the stream, and reducing surface water quality. Construction activities at existing and new stream crossings would disturb vegetation adjacent to the stream, increasing the potential for erosion. Soil-disturbing activities and excavation would have similar affects. In-stream work, particularly if vehicles are required to move into or across streams, would disturb bottom sediments and stream banks, also contributing to increased sediment in the water. Bank stabilization and channelization may be necessary for some crossings. These have the potential to change stream hydrology, altering water flow velocities and sediment loading and deposition patterns. Increased water temperatures, stream bank erosion, incising of stream channels, and reduction in stream meanders could result. Spills of fuel, lubricants, solvents, or other hazardous materials during construction at stream crossings could introduce contaminants into the water, reducing water quality. However, any contaminants are expected to be present in small amounts, consisting of that amount necessary for operation of equipment and insufficient to cause significant impacts to surface water quality beyond local reductions during construction.

The potential for these construction impacts would be limited to the short period required for crossing construction, indicated by DM&E to be approximately 14 days for bridge construction and 1 to 2 days for culverts. Surface water impacts would be of highest concern during construction of crossings of perennial streams, as water would be present in the stream bed, and during high water periods. However, as much of the year is relatively dry in the project area, resulting in the majority of streams crossed being intermittent, construction impacts to surface waters would primarily occur to those few perennial streams crossed. It is likely many of the intermittent stream crossings could be installed and reclamation measures implemented without water ever being present in the stream channel. In these instances, should a spill of hazardous substances occur, it could be contained and cleaned up without impacting surface water resources.

During rail line operation, surface waters could be impacted in the event of a derailment. Should diesel fuel or lubricants be released from locomotives or rail cars involved in a derailment, they could reduce local water quality. Severe spills of fuel could degrade water quality for a substantial distance downstream of the spill until the spill is contained or diluted. Additionally, increased TSS would likely result if a derailment resulted in coal being spilled into the water. While these impacts could occur, they are considered unlikely due to the rail line being maintained in good condition and the derailment needing to occur at a perennial stream crossing.

The infrequent (necessary only once every several years) disturbance to bottom sediments and stream banks associated with bridge or culvert maintenance activities would be the most likely impact during rail line operation. Such disturbances would be minor because they would involve little in-stream work or site disturbance. Additionally, during railroad operation, herbicide application within the rail line right-of-way to control vegetation could reduce water quality if herbicides are improperly applied or allowed to enter surface water.

Alternative B (Proposed Action)

Alternative B would cross 20 perennial streams and 623 intermittent streams. In South Dakota, it would cross 14 perennial streams, including 3 crossings of the Cheyenne River, and 208 intermittent streams, 4 of which are currently crossed by an existing rail line. In Wyoming, this alternative would cross 6 perennial streams and 415 intermittent streams. Alternative B would pass within 500 feet of the Cheyenne River and its perennial stream drainages for a total of 21.9 miles.

Alternative C (Modified Proposed Action)

Alternative C would cross 14 perennial streams and 520 intermittent streams. In South Dakota, this alternative would cross 10 perennial streams, including 3 crossings of the Cheyenne River and 230 intermittent streams, 5 of which are currenty crossed by an existing rail line. In Wyoming, this alternative would cross 4 perennial streams and 290 intermittent streams. Approximately 20.8 miles of Alternative C would be within 500 feet of the Cheyenne River and its perennial tributaries.

Alternative D (Existing Corridors Alternative)

Alternative D would cross 68 perennial and 707 intermittent streams. In South Dakota, Alternative D would cross 45 perennial streams, and 312 intermittent streams. Alternative D would cross the Cheyenne River twice in South Dakota. Of Alternative D's stream crossings, 40 perennial (including 2 of the Cheyenne River) and 197 intermittent stream crossings would be existing crossings where crossing structures would be rebuilt or replaced. In Wyoming, Alternative D would cross 23 perennial streams and 395 intermittent streams. Less than 13.5 miles of Alternative D would be within 500 feet of the Cheyenne River and tributaries.

4.4.7.2 Wetlands

Impacts to wetlands are considered by the U.S. Army, Corps of Engineers (COE) to be temporary, long-term, or permanent, depending on the amount of time it would take for the reestablishment of a functional wetland.[6] Reestablishment within three years after construction is considered a temporary impact. However, any reestablishment that takes longer than three years is considered long-term. The non-recoverable loss of a particular wetland or riparian area

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6 A reestablished wetland would be considered to be a functional wetland at such a time as it is capable of providing the functions performed by the original wetland. Such functions could include surface water retention, nutrient uptake, and wildlife habitat.

function is considered permanent. Construction of the alternatives would have the following impacts on wetland and riparian resources:

- Permanent loss or alteration due to placement of fill or dredging of substrate during construction, resulting in a change in hydrology, soils, or the composition of vegetation which could be temporary, limited to the construction period, or permanent throughout operation of the rail line.

- Permanent or temporary degradation of the functions of wetland or riparian resources.

Wetlands located within the rail line right-of-way would be lost during construction of the rail line. Sections 4.1.5.3 and 4.2.5.3 describe the various types of wetlands found throughout the project area and potentially lost. Clearing of vegetation, excavation, grading, and placement of fill to create a raised rail bed would destroy them. Additionally, if these wetlands extend outside the right-of-way, adjacent areas of wetlands may also be lost due to changes in surface water drainage flow, erosion, and sedimentation. Installation of rail line drainage structures may result in adjacent wetlands being drained. These indirect impacts are difficult to quantify due to lack of final design information. However, it is likely some wetlands would reestablish within the rail line right-of-way. These wetlands would likely be similar to those lost but smaller in size and of less value.

During project operation and maintenance, wetlands reestablished in the right-of-way may be subject to impacts similar to those of construction should maintenance activites require work in wetlands. These impacts would be sporatic and in confined areas. Contaminants, such as fuel and lubricants, and herbicides could enter wetlands, damaging vegetation and contaminating water or soil due to improper handling, use, or in the unlikely event of a derailment.

To quantify potential impacts to wetlands along each alternative, the wetland acres were determined based on USFWS National Wetland Inventory (NWI) mapping.[7]

[7] National Wetlands Inventory (NWI) mapping is performed by the U.S. Fish and Wildlife Service (USFWS). Aerial photography is used to identify potential wetland areas, based on observations of water or vegetation in the photographs. NWI maps provide a useful guide as to the potential for wetlands. However, they may indicate wetlands where they do not actually exist, and may also indicate uplands in areas where wetlands do exist. Additionally, indicated wetlands are not based on criteria established by the U.S. Army Corps of Engineers for wetlands under its jurisdiction as per the Clean Water Act. Use of NWI maps does however, provide a useful means of comparing the potential wetland impacts of alternatives.

Alternative B (Proposed Action)

Alternative B would cross approximately 1.2 miles of wetlands, resulting in the loss of approximately 62.1 acres of wetlands. Wetlands lost would include approximately 33.2 acres of emergent, approximately 16.5 acres of aquatic bed, approximately 8.7 acres of unconsolidated bottom, and 3.7 acres of scrub/shrub or forested wetlands (based on a 400-foot wide right-of-way). In South Dakota wetlands occur along approximately 0.8 mile of Alternative B, in Wyoming wetlands occur along approximately 0.4 mile of Alternative B.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 1.3 miles of wetland, resulting in the loss of approximately 62.2 acres of wetlands. Wetlands lost would include approximately 39.2 acres of emergent, 18.9 acres of aquatic bed, 2.9 acres of unconsolidated bottom, and 1.2 acres of scrub/shrub or forested wetlands (based on a 400-foot right-of-way). In South Dakota, wetlands are found along approximately 1.0 mile of the proposed new rail right-of-way. In Wyoming, wetlands occur along approximately 0.3 mile of new rail right-of-way.

Alternative D (Existing Corridors Alternative)

A total of approximately 1.6 miles of wetlands, approximately 40.7 acres, including approximately 26.4 acres of emergent, 11.0 acres of aquatic bed, 2.6 acres of unconsolidated bottom, and 0.7 acre of scrub/shrub or forested wetlands, would be within the new rail line right-of-way and lost during construction (based on a 200 foot right-of-way). In South Dakota, wetlands occur along approximately 0.4 mile of the new right-of-way. In Wyoming, wetlands are found along approximately 1.2 miles of the new right-of-way.

4.4.7.3 Groundwater and Wells

Construction and operation of the proposed project has the potential to impact groundwater and wells throughout the project area. Each of the Extension Alternatives has the potential to have similar impacts. During construction, cut activities could expose shallow aquifers, causing their water levels to be lowered. Shallow, low-yield wells used for watering livestock could have their yields reduced or stopped. DM&E has indicated it would likely obtain some of its water needs during construction from local wells, subject to agreements with landowners. Additional water demand from these wells could result in local drawdowns of groundwater around the individual wells, reducing their yields. Yields would be expected to return to normal once pumping demands returned to previous amounts. Maintenance requirements on these wells may, however, be accelerated due to above normal use. Spills of fuels or other hazardous materials during construction could result in contamination of groundwater. This is very unlikely due to the small quantities of such materials that would be on site and the depth to groundwater (several hundred feet to over one thousand feet below ground surface). The exception would be if spills occurred in river valleys where the relatively shallow alluvial aquifer could be affected. Any contamination would not likely be significant due to the limited quantities of materials available to enter the aquifer and its dilution upon entering the groundwater.

Wells used for construction water needs that experience reductions in yield would be expected to return to normal during project operation. In the unlikely event a spill of hazardous materials occurred during train operation in the vicinity of a shallow aquifer or an open well, contamination of the aquifer or well could occur. However, the likelihood of this occurring is considered very unlikely due to the small quantities of hazardous materials potentially released, the few and scattered shallow alluvial aquifers, and wells being located outside the rail line right-of-way.

4.4.8 AIR QUALITY

Construction and operation of the proposed project alternatives would result in changes to the air quality of the project area. While emissions during both construction and operation of the project would generally be consistent with the types of emissions currently present in the project area, increases in emissions would be expected.

Construction related impacts to air quality would generally be localized around the area of construction activity. However, some impacts would likely occur throughout the project area. Local air quality impacts related to construction activity would be short-term and occur at only several isolated, scattered locations at any given time during the two to three year construction period. The primary construction impact to air quality would be the increase in fugitive dust. This increases would occur from a variety of construction activities. Increased traffic from construction workers and equipment on local gravel roads would stir dust from these roadways. Blasting, excavation, and earthmoving activities would also contribute to dust. As noted in Section 4.4.5.3, many of the project area soils are suceptible to wind erosion. Clearing of the right-of-way and earthmoving activities would expose these soils to increased opportunity for wind erosion. Transport of fill material in uncovered trucks could also contribute to fugitive dust. Following completion of construction and reclamation of the right-of-way, these impacts would no longer be expected to continue.

Emissions from construction vehicles and equipment would also impact air quality. These impacts would primarily be confined to the right-of-way where construction activities would be most concentrated. As noted above, the scattered nature of construction would spread equipment emission over a large area. Additionally, emissions would be quickly dispersed by wind, preventing them from becoming concentrated. Vehicle and diesel emissions are common and widespread throughout the project area, although they occur at very low levels. They are particularly prevailent at the various mines throughout the PRB to which this project would connect. Air emissions during construction are not anticipated to reduce air quality in the overall project area due to the temporary and scattered nature of construction activities, construction being confined to the rail line right-of-way and the wind dispersion of emissions.

In-transit loss of coal from railcars during project operation is also expected to occur, potentially increasing fugitive dust along the rail line. However, fugitive dust emissions from these coal losses are intermittent and difficult to quantify. PRB coal has a high moisture content, averaging about 30 percent moisture.[8] The moisture in the coal tends to reduce fugitive dust compared to drier eastern coals that average about 10 percent moisture.[9] Also, the cooler climate of South Dakota and Wyoming tends to cause the coal to freeze together during colder times of the year, further limiting fugitive coal losses during these periods. During the warmer months, rain mixing with the clay in the coal tends to crust the coal pile and significantly reduce fugitive coal emissions during transport.

Some coal losses would be expected during the drier part of the summer months. However, SEA identified no detailed studies that provided information on the amount of coal dust lost from rail transportation or the potential problems it could create. SEA contacted numerous State air quality and pollution control agencies to obtain input on the coal dust-loss issues. SEA contacted the South Dakota Department of Environment and Natural Resources (which also provided information on contacts with the North Dakota and Nebraska Departments of Natural Resources), Wyoming Department of Environmental Quality, Minnesota Pollution Control Agency, Colorado Department of Public Health & Environment, and the Missouri Department of Natural Resources. These states were contacted due to their inclusion in the project area, being known to have rail lines overwhich PRB coal is transported, or both. It was the opinion of these agencies that loss of coal dust does not represent a significant environmental hazard, and that in their experience, loss of coal in the size range to become airborne is an infrequent event. This position is largely based on lack of complaints from persons along the rail

[8] Lick, Robert. 1991. 1991 Keystone Coal Industry Manual. Robert Lick Publisher. Maclean Hunter Publications. Chicago, Illinois. 1991.

[9] Ibid.

routes for coal transportation about coal dust and agencies' field personnel not observing coal dust blowing from open rail cars or settled along the rail lines. Based on this anecdotal evidence, SEA does not believe fugitive coal dust poses a significant environmental concern. However, it does acknowledge that some fugitive coal dust may be noticed along the rail line potentially causing inconvenience to adjacent residents and businesses by requiring periodic washing of buildings, vehicles, and other outside surfaces.

SEA determined that the increases in rail traffic at each analyzed level of operation (20 MNT, 50 MNT, and 100 MNT) would exceed the Board's thresholds, found at 49 CFR 1105.7, for environmental analysis of air quality impacts. These thresholds require SEA to conduct detailed analysis of potential air quality impacts from construction projects that result in an increase of 8 or more trains per day in areas classified as attainment for all criteria pollutants. As all counties in the project area are classified as attainment, this threshold applies to this analysis. Additionally, the Board's regulations require SEA to evaluate potential air quality impacts on other portions of DM&E's rail system where rail traffic would exceed this threshold due to the proposed construction project.

DM&E indicated in its Application that it intends to transport up to 100 MNT of coal per year and that interchanges with other rail carriers are available to route the coal to the users. However, because contracts for coal transportation have not yet been obtained by DM&E, SEA cannot reasonable determine the exact routes overwhich DM&E coal would be transported. Therefore, SEA cannot determine the rail lines which would exceed the Board's thresholds. SEA determined it reasonably for all the increases in rail traffic to occur throughout the existing DM&E system. Thus, SEA performed a system-wide analysis to determine the potential impacts of the proposed project Extension Alternatives on air quality resulting from the operation of unit coal trains that would occur as a result of this project along the entire DM&E rail line. SEA's analysis included proposed emissions increases along the new Extension Alternatives and DM&E's existing rail line across South Dakota and Minnesota. SEA's analysis of air quality impacts along the Extension Alternatives is contained in this Section. Air quality impacts from new rail yards along these alternatives are included at Section 4.9. The results of the air quality analysis for Minnesota are found in Chapter 3, Sections 3.2, and 3.4, and for the existing rail line in South Dakota at Sections 4.3.1 and 4.8.

SEA analyzed emissions (in tons per year) for sulfur dioxide (SO_2), hydrocarbons (HC),[10] particulate matter of less than 10 microns in diameter (PM_{10}), oxides of nitrogen (NO_X), carbon monoxide (CO), and lead (Pb). SEA's analysis was based on the presumption that the demand for PRB coal would increase, with DM&E hauling up to 100 MNT annually and the existing rail carriers hauling future amounts of coal no less than their current levels. Therefore, emissions from DM&E locomotives for this project would represent an increase in the emissions observed for the counties through which the alternatives pass. The project emissions during rail line operation include those from diesel locomotives along the rail lines and within the rail yards. Emissions in the rail yards that would be part of the Extension Alternatives are primarily due to locomotives idling while crews are changed. These emissions are included in Section 4.9.

The emission changes resulting from the proposed project alternatives are given in the following Section on a county-wide basis. The emission calculations and methodology are provided in Appendix E. SEA compared the results of its analysis to the the Environmental Protection Agency's (EPA) major source thresholds for stationary sources. This use of threshold screening levels is consistent with previous SEA studies. EPA's major source thresholds for stationary sources provide the emissions level for each criteria pollutant at which a stationary source of that air pollutant would be required to apply for a major construction or operating permit. No thresholds are currently established for mobile emission sources, such as locomotives. Therefore, SEA used the EPA stationary sources as a reference. If the projected county-wide emissions levels exceeded the air quality screening levels shown in Table 4.4-1, then SEA performed a more detailed air dispersion modeling.

SEA identified eight counties crossed by the Extension Alternatives in South Dakota and Wyoming that meet the STB threshold of eight or more trains per day for air quality analysis. For each county, SEA summed air emissions increases from increases in rail operations and compared them to the air emission screening thresholds shown in Table 4.4-1.

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[10] Hydrocarbons are a category of chemical substances containing the elements carbon and hydrogen. A variety of different hydrocarbon compounds are emitted by locomotives. EPA's locomotive emission factors were used to calculate the hydrocarbon emissions resulting from this project. Hydrocarbon emissions are a consideration in this analysis as many of them compose a subgroup of compounds known as volatile organic compounds (VOCs). VOCs can easily combine with other chemicals, including those in the air, to form ozone, one of EPA's criteria pollutants. Generally, one ton of VOC emissions will react to produce one ton of ozone. Therefore, VOC emissions provide a surrogate for potential ozone production. However, EPA's emission factors for locomotives do not include VOC emissions, only hydrocarbons. Therefore, SEA's use of hydrocarbon emissions as a surrogate for VOCs is overly conservative as only the VOC component of hydrocarbons would produce ozone.

Table 4.4-1
County Emissions Screening Levels

Pollutant	**Area Designation**	**Emissions Screening Levels (tons/year)**
Nitrogen Oxides (NO_X)	1. Attainment/Maintenance for NO_2 2. Marginal/Moderate ozone 3. Ozone Attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25
Volatile Organic Compounds (VOCs)	1. Attainment/Maintenance for Ozone 2. Marginal/Moderate Ozone Non-attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25
Carbon Monoxide (CO)	1. Attainment/Maintenance for CO 2. Marginal/Moderate Ozone Non-attainment	100
	CO Serious Non-Attainment	50
Particulate Matter less than 10 microns (PM_{10})	1. PM_{10} Attainment or Maintenance 2. PM_{10} Moderate Non-attainment	100
	PM_{10} Serious Non-attainment	70
Sulfur Dioxide (SO_2)	SO_2 Attainment or Non-attainment	100
Lead (Pb)	Pb Attainment or Non-attainment	0.6

A summary of the potential emission increases for each alternative at the 20 million ton level of operation is shown in Tables 4.4-2 through 4.4-4. The 20 million ton level of annual coal transportation was evaluated because DM&E indicated it was the "break even" level for the project. Increases in bold indicate they are greater than EPA's major source threholds for stationary sources provided in Table 4.4-1.

A summary of the potential emission increases for the 50 million tons alternative is shown in Tables 4.4-5 through 4.4-7. The 50 million ton level of coal transportation was evaluated because DM&E indicated this would be approximately the level of operation shortly after project start up. Increases in bold indicate they are greater than EPA's major source threholds for stationary sources provided in Table 4.4-1.

A summary of the potential emission increases for the 100 million tons alternative is shown in Tables 4.4-8 through 4.4-10. The 100 million ton level of operation was evaluated because DM&E indicated this was the maximum level at which its system could operate. Increases in bold indicate they are greater than EPA's major source threholds for stationary sources provided in Table 4.4-1.

Table 4.4-2
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative B - 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**131.39**	100	8.21	100	22.05	100	5.55	100	13.80	100	0.0005	0.6
Custer	52.45	100	3.28	100	8.81	100	1.83	100	5.51	100	0.0002	0.6
Fall River	**229.17**	100	14.31	100	38.46	100	9.69	100	24.07	100	0.0008	0.6
Niobrara	80.97	100	5.06	100	13.59	100	3.42	100	8.50	100	0.0003	0.6
Weston	**288.75**	100	18.04	100	48.46	100	12.21	100	30.33	100	0.0010	0.6
Converse	69.26	100	4.33	100	11.62	100	2.93	100	7.27	100	0.0002	0.6
Campbell	**285.70**	100	17.84	100	47.95	100	12.08	100	30.01	100	0.0010	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 254.4

Table 4.4-3
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative C - 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**131.39**	100	8.21	100	22.05	100	5.55	100	13.80	100	0.0005	0.6
Custer	62.13	100	3.89	100	10.43	100	2.63	100	6.53	100	0.0002	0.6
Fall River	**242.92**	100	15.18	100	40.77	100	10.27	100	25.52	100	0.0008	0.6
Niobrara	80.97	100	5.06	100	13.59	100	3.42	100	8.50	100	0.0003	0.6
Weston	**201.67**	100	12.60	100	33.84	100	8.52	100	21.18	100	0.0007	0.6
Converse	51.94	100	3.24	100	8.72	100	2.20	100	5.46	100	0.0002	0.6
Campbell	**322.36**	100	20.13	100	54.10	100	13.63	100	33.86	100	0.0011	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 241.7

Table 4.4-4
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative D - 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**401.81**	100	25.10	100	67.43	100	16.98	100	42.20	100	0.0014	0.6
Custer	**152.27**	100	9.51	100	25.55	100	6.44	100	15.99	100	0.0005	0.6
Fall River	**356.99**	100	22.30	100	59.91	100	15.09	100	37.49	100	0.0012	0.6
Weston	**453.75**	100	28.34	100	76.15	100	19.18	100	47.66	100	0.0016	0.6
Crook	86.57	100	5.41	100	14.53	100	3.66	100	9.09	100	0.0003	0.6
Campbell	**296.39**	100	18.51	100	49.74	100	12.53	100	31.13	100	0.0010	0.6
Converse	51.94	100	3.24	100	8.72	100	2.20	100	5.46	100	0.0002	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 353.4

Table 4.4-5
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative B - 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**312.59**	100	19.53	100	52.46	100	13.22	100	32.83	100	0.0011	0.6
Custer	**124.79**	100	7.80	100	20.95	100	5.28	100	13.10	100	0.0004	0.6
Fall River	**545.21**	100	34.06	100	91.50	100	23.05	100	52.26	100	0.0019	0.6
Niobrara	**192.64**	100	12.03	100	32.33	100	8.14	100	20.23	100	0.0007	0.6
Weston	**686.97**	100	42.91	100	**115.29**	100	29.04	100	72.15	100	0.0024	0.6
Converse	**164.70**	100	10.29	100	27.65	100	6.97	100	17.31	100	0.0006	0.6
Campbell	**679.70**	100	42.45	100	**114.07**	100	28.73	100	71.39	100	0.0023	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 254.4

Table 4.4-6
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative C - 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**312.59**	100	19.53	100	52.46	100	13.22	100	32.83	100	0.0011	0.6
Custer	**147.82**	100	9.24	100	24.81	100	6.26	100	15.52	100	0.0005	0.6
Fall River	**577.93**	100	36.10	100	96.99	100	24.43	100	60.70	100	0.0020	0.6
Niobrara	**192.64**	100	12.03	100	32.33	100	8.14	100	20.23	100	0.0007	0.6
Weston	**479.79**	100	29.97	100	80.52	100	20.28	100	50.39	100	0.0016	0.6
Converse	**123.58**	100	7.72	100	20.74	100	5.22	100	12.98	100	0.0004	0.6
Campbell	**766.94**	100	47.90	100	**128.71**	100	32.42	100	80.55	100	0.0026	0.6

Gross Ton Increase:	68,915,700.00
Fuel Efficiency Factor (ton miles per gallon):	993.80
Total length of Segments (miles):	241.7

Table 4.4-7
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative D - 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**955.94**	100	59.71	100	**160.43**	100	40.41	100	**100.40**	100	0.0033	0.6
Custer	**362.26**	100	22.63	100	60.80	100	15.31	100	38.05	100	0.0012	0.6
Fall River	**849.32**	100	53.05	100	**142.54**	100	35.90	100	89.20	100	0.0029	0.6
Weston	**1079.52**	100	67.43	100	**181.17**	100	45.63	100	**113.38**	100	0.0037	0.6
Crook	**205.97**	100	12.87	100	34.57	100	8.71	100	21.63	100	0.0007	0.6
Campbell	**705.14**	100	44.04	100	**118.34**	100	29.81	100	74.06	100	0.0024	0.6
Converse	**123.58**	100	7.72	100	20.74	100	5.22	100	12.98	100	0.0004	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 353.4

Table 4.4-8
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative B - 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**610.25**	100	38.11	100	**102.41**	100	25.79	100	64.09	100	0.0021	0.6
Custer	**234.62**	100	15.21	100	40.88	100	10.29	100	25.58	100	0.0008	0.6
Fall River	**1064.38**	100	**66.48**	100	**178.62**	100	44.99	100	**111.79**	100	0.0037	0.6
Niobrara	**376.08**	100	23.49	100	63.12	100	15.90	100	39.50	100	0.0013	0.6
Weston	**1341.13**	100	83.77	100	**225.07**	100	56.69	100	**140.85**	100	0.0046	0.6
Converse	**321.68**	100	20.09	100	53.99	100	13.60	100	33.79	100	0.0011	0.6
Campbell	**1326.94**	100	82.88	100	**222.69**	100	56.09	100	**139.36**	100	0.0046	0.6

Gross Ton Increase: 4,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 254.4

Table 4.4-9
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative C - 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**610.25**	100	38.11	100	**102.41**	100	25.79	100	64.09	100	0.0037	0.6
Custer	**288.57**	100	18.02	100	48.43	100	12.19	100	25.83	100	0.0032	0.6
Fall River	**1128.25**	100	70.47	100	**189.34**	100	47.69	100	**118.49**	100	0.0054	0.6
Niobrara	**376.08**	100	23.49	100	63.12	100	15.90	100	39.50	100	0.0013	0.6
Weston	**936.66**	100	58.50	100	**157.19**	100	39.59	100	98.37	100	0.0032	0.6
Converse	**241.26**	100	15.07	100	40.49	100	10.20	100	25.34	100	0.0008	0.6
Campbell	**1497.24**	100	93.52	100	**251.27**	100	63.29	100	**157.25**	100	0.0051	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 241.7

Table 4.4-10
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative D - 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**1866.22**	100	**116.57**	100	**313.20**	100	78.89	100	**196.00**	100	0.0064	0.6
Custer	**707.23**	100	44.17	100	**118.69**	100	29.90	100	74.28	100	0.0024	0.6
Fall River	**1658.08**	100	**103.56**	100	**278.26**	100	70.09	100	**174.14**	100	0.0057	0.6
Weston	**2107.49**	100	131.63	100	**353.69**	100	89.09	100	**221.34**	100	0.0072	0.6
Crook	**402.10**	100	25.12	100	67.48	100	17.00	100	42.23	100	0.0013	0.6
Campbell	**1376.61**	100	**85.98**	100	**231.03**	100	58.19	100	**144.58**	100	0.0047	0.6
Converse	**241.26**	100	15.07	100	40.49	100	10.20	100	25.34	100	0.0008	0.6

Gross Ton Increase:	134,539,615.00
Fuel Efficiency Factor (ton miles per gallon):	993.80
Total length of Segments (miles):	353.4

For the 20 and 50 million ton per year options, SEA prediced NO_x, CO and SO_2 emissions would exceed the major source thresholds in several counties. For the 100 million ton per year option, SEA predicted NO_x, CO, SO_2, and also HC emissions would exceed the major source thresholds in several counties. Therefore, the results of the CALPUFF air dispersion modeling were reviewed to determine if the impacts from the new rail traffic would be expected to exceed the National Ambient Air Quality Standards (NAAQS) or the Prevention of Significant Deterioration (PSD) increments. The NAAQS are an air quality standard established by EPA for the protection of human health and welfare. They provide the maximum allowable concentrations for a pollutant in a particular county, and take into consideration emissions inside and outside the county that could affect the county. The NAAQS for the various pollutants are:

- NO_x - 100 micrograms/cubic meter (annual average),
- CO - 40,000 micrograms/cubic meter (1 hour average),
- CO - 10,000 micrograms/cubic meter (8 hour average),
- SO_2 - 80 microgram/cubic meter (annual average),
- SO_2 - 365 micrograms/cubic meter (24 hour average)
- SO_2 - 1,300 micrograms/cubic meter (3 hour average - secondary standard),
- PM_{10} - 50 micrograms/cubic meter (annual average),
- PM_{10} - 150 micrograms/cubic meter (24 hour average).

PSD increments are established by EPA. PSD standards have been established which serve to keep areas which have very good air quality from being degraded to NAAQS by allowing only certain increments (increases) above existing background air quality conditions. PSD allowable increments are not the same for all areas of the country. For purposes of allowable increases, areas of the county have been designated as either Class I or Class II.

A Class I airshed is an area designated by Congress as having "special national or regional value from a natural, scenic, recreational, or historical perspective." Examples of Class I areas include national parks and wilderness areas larger than 5,000 acres and other areas designated by the states or Tribes. Class I areas are designed to have the best air quality and, therefore, have the smallest allowable increments. Designation as a PSD Class I (Class I) area affords the area an increased level of protection for its air quality. PSD Class I increments are more stringent than Class II increment and are:

- NO_x - 2.5 micrograms/cubic meter (annual average)
- SO_2 - 2 micrograms/cubic meter (annual average)
- SO_2 - 5 micrograms/cubic meter (24 hour average)
- SO_2 - 25 micrograms/cubic meter (3 hour average)

· PM_{10} - 4 micrograms/cubic meter (annual average)
· PM_{10} - 8 micrograms/cubic meter (24 hour average)

The Class I airsheds of concern for this project include Badlands National Park/Sage Creek Wilderness area and Wind Cave National Park.

Class II areas have larger allowable increases. Class II increments have been identified for NO_X, SO_2, and PM_{10} and are:

· NO_x - 25 microgram/cubic meter (annual average),
· SO_2 - 20 micrograms/cubic meter (annual average),
· SO_2 - 91 micrograms/cubic meter (24 hour average),
· SO_2 - 512 micrograms/cubic meter (3 hour average),
· PM_{10} - 17 micrograms/cubic meter (annual average),
· PM_{10} - 30 micrograms/cubic meter (24 hour average).

All the alternatives would be constructed through PSD Class II areas. However, air pollutants disperse from sources (such as locomotive engines) and can affect air quality many miles away from the emission's source. Concerns have been raised about the potential for pollutants generated by the locomotives to affect nearby Class I areas where the increment is lower. They are the amount emissions of a particular pollutant can be increased above the existing emission level for that pollutant in a particular county. However, they do not enable emissions for a particular pollutant to exceed the NAAQS standards. For example, the NAAQS for NO_x is 100 microgram/cubic meter. If the existing NO_x level is 25 microgram/cubic meter, a new emissions source would have 75 microgram/cubic meter of emissions before it would reach the NAAQS level. However, PSD Class II increments would only allow the emissions to increase by 25 microgram/cubic meter. Should the existing emissions be 80 microgram/cubic meter for NO_X, while PSD Class II increments would allow it to be increased by 25 microgram/cubic meter, NAAQS standards would only allow an increase of 20 microgram/cubic meter.

SEA used the CALPUFF model to determine potential visibility impacts to Class I airsheds as discussed below. SEA also used the results of the CALPUFF model to determine screening-level ambient air quality impacts near the rail line alternatives ("near-field" impacts) for comparison to the National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) Class II increments. The PSD Class II increments are the amounts of emissions increases above which a source is considered to "significantly deteriorate" the air quality of a particular area. SEA performed this analysis to determine if the emissions increases from the proposed alternatives could cause or contribute to a violation of the applicable state and Federal ambient air quality standards or PSD Class II increments. SEA's analysis showed that maximum projected ambient concentrations would be significantly lower than the ambient air quality standards or Class II increments. That is, emissions from the railroad are not expected to cause or contribute to a violation of the applicable state or Federal ambient air quality standards. The modeling methodology is described in Appendix E (reference *Attachment 1: CALPUFF Technical Support Document*).

Recent studies by the BLM on projects within the PRB, including the Wyodak Coal Bed Methane Environmental Impact Statement and Horse Creek Coal Lease Environmental Impact Statement, indicated concern for visibility at Class I airsheds due to emissions in the PRB region.

The Class I airsheds of concern for this project include Badlands National Park/Sage Creek Wilderness area and Wind Cave National Park. The BLM studies indicated emissions throughout the PRB, including those from locomotives hauling the region's coal, were contributing to reduced air quality in the form of reduced visibility at these Class I areas. Based on the BLM's findings and concerns expressed by the National Parks Service (NPS) and USFS, SEA conducted a dispersion modeling analysis for the PRB and these Class I areas to determine the potential impacts of the proposed alternatives on the visibility at these areas. SEA used the CALPUFF model to evaluate the effects of total DM&E locomotive emission, including emissions along the proposed alternatives and at rail yards, on these Class I areas due to operation of the proposed alternatives. SEA modeled each of the Extension Alternatives at the 20 MNT, 50 MNT, and 100 MNT operation scenarios.

Three Class I areas, Badlands National Park, Wind Cave National Park and the Sage Creek Wilderness Area (within Badlands National Park), exist in relatively close proximity to the alternatives. Both Class I areas are located in South Dakota. Alternative D would be constructed less than 3 miles east of Wind Cave National Park in Custer County. The Sage Creek Wilderness Area is located approximately 6.2 miles south of Alternatives B and C west of Wall in Pennington County.

Since 1987, EPA has supported the Interagency Monitoring of Protected Visual Environments (IMPROVE) network in cooperation with the NPS, Forest Service, BLM, USFWS, and state agencies. One of the principal purposes of the IMPROVE network is to gather data that can be used to identify sources of impairment on an individual site, regional and national scale. This network began with 20 long-term monitoring sites in 1987 and now includes over 40 sites in parks and wilderness areas across the nation. There is an IMPROVE monitoring site in Badlands National Park. The Badlands IMPROVE monitoring site ranks in the middle of the range from cleanest to dirtiest monitoring sites in the nation (ranked 22 out of 42 total sites). The visibility degradation, like may rural western areas, is largely due to sulfate, organic and soot aerosols. Visibility at the Badlands National Park IMPROVE site is generally considered to be only average.

Recent studies by the BLM on projects within the PRB, including the Wyodak Coal Bed Methane Environmental Impact Statement and Horse Creek Coal Lease Environmental Impact Statement, indicated concern for visibility at Class I airsheds due to emissions in the PRB region. The Class I airsheds of concern for this project include Badlands National Park/Sage Creek Wilderness area and Wind Cave National Park. The BLM studies indicated emissions throughout the PRB, including those from locomotives hauling the region's coal, were contributing to reduced air quality in the form of reduced visibility at these Class I areas. Based on the BLM's findings and concerns expressed by the National Parks Service (NPS) and USFS, SEA conducted a dispersion modeling analysis for the PRB and these Class I areas to determine the potential impacts of the proposed alternatives on the visibility at these areas. SEA used the CALPUFF model to evaluate the effects of total DM&E locomotive emission, including emissions along the proposed alternatives and at rail yards, on these Class I areas due to operation of the proposed alternatives. SEA modeled each of the Extension Alternatives at the 20 MNT, 50 MNT, and 100 MNT operation scenarios.

Visibility impairment is generally referred to in units of deciview (dv) or percent extinction. The dv scale is similar to the decibel scale for noise in that zero deciview represents clean air or zero impairment as zero decibels represents no noise. As dv measurements increase above zero, they indicate reduced, or more impaired, visibility. These units measure the distance a person can see a landscape feature and the amount of contrast, detail, and color that is perceived. As humidity, cloud cover, weather, or air polllution levels change, so do the components of visibility (detail, constrast, color) perceived by the viewer. Simply stated, the less light able to pass through the atmosphere, the less visible an object on the landscape. Therefore, because humidity, cloud cover, and pollution absorb or reflect light, the greater their levels, the lower the visibility. This reduction in light due to reflection or absorption is referred to as extinction. The greater the atmospheric light extinction, the lower the visibility. In terms of perception, the human eye can normally perceive changes in visibility, under a range of circumstances, measured as greater than 1.0 dv. This corresponds to greater than 10 percent extinction of atmospheric light. While normally unnoticable to the human eye, a 0.5 dv, or 5 percent light extinction, level is considered by the NPS and USFS as a level of impairment to consider when evaluating a project's potential impacts to air quality. The 0.5 dv level provides a level of impairment above which reductions in visibility can potentially become noticable. Therefore, it is a useful level to evaluate the potential for adverse visibility impairment. Additionally, these agencies may consider visibility impairment above 0.5 dv due to air pollution to be unnatural and therefore consider them adverse affects.

The results of SEA's visibility modeling are provided in Tables 4.4-11 to 4.4-13. Based on the modeling, Class I airsheds (Badlands National Park, Sage Creek Wilderness Area, and Wind Cave National Park) would not experience any visual impairment at the 20 MNT level due to Alternative C. However, all of the alternatives would impair visibility at Class I airsheds under the 50 MNT and 100 MNT levels. Table 4.4-14 to 4.4-16 provides the months and number of days in each month that visual impairment would occur to the Class I airsheds as a result of each Extension Alternative. SEA correlated the months when impairment to Class I airsheds would occur with monthly visitor use information to evaluate the potential significance of visual impairment. Table 4.4-17 provides monthly visitor use information for these areas. SEA noticed that the days modeled to have impaired visibility generally occurred during the low-use winter and early spring months. Only a small percentage of the visitors to these areas would be expected to experience reduced visibility as a result of any of the Extension Alternatives, even at the 100 MNT level. Those few visitors unfortunate enough to visit one of these areas on an impaired day could experience what they perceive as significant reductions in visibility. This perception would largely be based on the individual. In particular, if they had visited the area before and not experienced impaired visibility they would be more aware of reduced visibility. However, if the visitor had not previously visited the area, they would be unfamiliar with the landscape and may not recognize that their view was impaired. While overall significance is difficult to determine, it appears that each alternative would have adverse impacts to visibility at the 50 MNT and 100 MNT operating levels due to the number of days having 0.5 dv or greater impairment.

Table 4.4-11
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 20 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
Badlands NP	0	0	1	0	0	0	40	39	45	14	13	14
Blackelk WA	0	0	0	0	0	0	66	66	68	25	25	25
Mt. Rushmore	0	0	0	0	0	0	59	59	63	22	22	22
Wind Cave NP	0	0	0	0	0	0	78	78	79	25	25	27
Jewel Cave NP	0	0	0	0	0	0	92	93	92	40	40	40
Devil's Tower	0	0	0	0	0	0	143	143	144	70	70	70

Table 4.4-11
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 20 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
North Cheyenne	0	0	0	0	0	0	38	38	38	24	24	24
Cloud Peak WA	0	0	0	0	0	0	33	33	33	17	17	17

Table 4.4-12
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 50 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
Badlands NP	1	0	10	0	0	1	51	52	58	15	15	17
Blackelk WA	0	0	3	0	0	0	72	73	75	28	28	28
Mt. Rushmore	0	0	3	0	0	0	65	65	70	23	23	23
Wind Cave NP	1	1	2	0	0	0	79	79	82	29	28	29
Jewel Cave NP	0	0	2	0	0	0	96	96	98	40	40	41
Devil's Tower	1	1	1	0	0	0	144	144	146	70	71	71
North Cheyenne	2	2	3	0	0	0	39	39	40	24	24	24
Cloud Peak WA	0	0	0	0	0	0	33	33	34	19	19	20

Table 4.4-13
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 100 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
Badlands NP	12	9	31	1	0	7	60	57	82	21	22	33
Blackelk WA	5	3	9	0	0	3	77	78	85	29	30	33
Mt. Rushmore	4	3	7	0	0	3	74	74	80	26	28	30
Wind Cave NP	3	3	12	1	1	2	84	84	92	30	32	34
Jewel Cave NP	5	4	8	0	0	1	99	99	105	41	41	44
Devil's Tower	3	4	5	1	1	1	147	146	150	72	72	74
North Cheyenne	4	4	6	2	2	3	40	40	41	24	24	24
Cloud Peak WA	0	1	1	0	0	0	35	35	35	20	20	20

Table 4.4-14
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 20 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Badlands NP	0	0	1 - January	0	0	0

Table 4.4-15
Days of Visibility Impairment By Month
At Sensitive Visual Areas for Extension Alternatives at 50 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Badlands NP	1 - March	0	2 - January 1 - March 1 - April 1 - May 1 - June 1 - August 1 - November 1 - December	0	0	1 - January
Blackelk WA	0	0	2 - April 1 - May	0	0	0
Mt. Rushmore	0	0	2 - April 1 - May	0	0	0
Wind Cave NP	1- April	1 - April	2 - April	0	0	0
Jewel Cave NP	0	0	2 - April	0	0	0
Devil's Tower	1 - February	1 - February	1 - February	0	0	0

Table 4.4-15
Days of Visibility Impairment By Month
At Sensitive Visual Areas for Extension Alternatives at 50 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
North Cheyenne	2 - February	2 - February	1 - January 2 - February	0	0	0

Table 4.4-16
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 100 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Badlands NP	2 - January 1 - February 2 - April 1 - May 1- November 4 - December	1- February 1 - March 2 - April 1 - November 4 - December	4 - January 4 - February 1 - March 2 - April 3 - May 1 - June 1 - August 2 - September 6 - December	1 - March	0	2 -January 1- March 1 - Aprii 1 - May 1 - November 1- December
Blackelk WA	1 - February 1 - March 2 - April 1 - May	1 - February 1 - March 1 - April	1 - January 3 - February 2 - March	0	0	2- April 1 - May
Mt. Rushmore	1 - February 2 - April 1- May	1 - February 1 - March 1 - April	1 - January 2 - February 1 - March	0	0	2 - April 1 - May

Table 4.4-16
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 100 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Wind Cave NP	1 - March 1 - April	1 - February 1 - March	1 - January 2 - February 2 - March 2 - May 1 - June 1 - September 1 - December	1 - April	1 - April	2- April
Jewel Cave NP	1 - January 1 - February 1 - March 2 - April	1 - January 1 - February 1 - March 1 - April	1 - January 3 -February 1 - March 1 - April 1 - May	0	0	1 - April
Devil's Tower	1 - January 1 - February	1 - January 1 - February 1 - March	1 - January 2 - February 1 - March	1- February	1 - February	1 - February
North Cheyenne	1- January 1- March	1 - January 1 - March	1 - February 1 - March 1 - May	2 - February	2 - February	1 - January 2 - February
Cloud Peak WA	0	1 - January	1 - January	0	0	0

South Dakota and Wyoming do not currently regulate emissions from locomotives. However, the 1990 Clean Air Act amendments included a specific mandate for EPA to regulate locomotive emissions. According to the EPA (1997), unregulated locomotives are estimated to contribute almost 5 percent of the total nationwide emissions of NO_X, which is more than 10 percent of the nationwide mobile sources of NO_X emissions.

EPA has developed emission standards for NO_X, hydrocarbons, carbon monoxide, particulate matter, and smoke for newly manufactured and remanufactured diesel-powered locomotives and locomotive engines. EPA (1997) predicts that these new standards, which took effect in 2000, will achieve approximately a 66 percent reduction in NO_X emissions. Hydrocarbon and particulate matter will be reduced by about 50 percent.

SEA also looked at vehicle delays to determine if emissions from vehicles waiting for a passing train would potentially reduce air quality. However, none of the grade crossings of roadways for any of the Extension Alternatives would be of roadways with ADTs equal to or greater than 5,000 vehicles per day. Most of the roadways crossed have ADTs of less than 500 vehicles per day. SEA concluded that the low levels of vehicle traffic on roadways that would be crossed by the proposed project would result in few vehicles being delayed per train crossing event. Therefore, no impacts to air quality would result from idling vehicles delayed at grade crossings.

Table 4.4-17
Number of Recreation Visits at National Parks Per Month in 1998

Month	Badlands National Park	Mount Rushmore National Memorial	Wind Cave National Park	Devils Tower National Monument	Jewel Cave National Monument	Cloud Peak Wilderness Area	Black Elk Wilderness Area
January	6,490	13,964	14,994	2,228	252	No Monthly Statistics Available	No Statistics Available
February	5,369	17,858	16,629	2,384	301		
March	6,629	23,760	26,145	3,642	886		
April	19,097	42,802	31,284	8,149	1,740		
May	72,123	143,202	103,949	28,083	5,278		
June	214,871	365,486	123,336	77,524	24,621		
July	243,051	570,456	195,530	106,847	44,414		
August	253,556	467,944	186,315	105,850	35,022		
September	125,014	262,449	78,266	44,929	13,860		
October	57,885	71,557	37,298	13,237	3,524		
November	11,298	18,135	20,289	4,023	684		
December	5,666	16,872	15,939	2,168	476		
TOTAL	1,021,049	2,014,485	849,974	399,064	131,058	60,000-70,000	

4.4.9 NOISE and VIBRATION

4.4.9.1 Noise

The construction and operation of the proposed project would result in the generation of noise. During construction, temporary noise would be generated from operation of construction vehicles and heavy equipment. These impacts would occur only during the period required to construct the rail line in a particular area. Construction of culverts and bridges would take from a day or two up to a few weeks. Following installation of culverts and bridges, the rail bed would be prepared. Rail bed preparation could occur concurrently or immediately following culvert and bridge construction or could occur some time afterward. Once the rail bed is prepared, taking from several days to several weeks per mile depending on cut or fill requirements, ballast, track, and ties would be installed at approximately one mile per day. Once completed, another section of rail line would be constructed. In this way, impacts from construction noise would be moved along the rail line, with actual noise impacts occurring to adjacent areas and along limited portions of the rail line at any given time.

Although construction activities and associated noise would be temporary, only occurring until construction was completed, they could occur around the clock in order to complete construction activities as quickly as possible. Normally, construction would be expected to occur in two shifts, from approximately 6 a.m. to 11 p.m., with equipment maintenance occurring between 11 p.m. and 6 a.m. Impacts from construction noise would be similar to those described in Section 4.3.9 and would include disturbance to residences near the rail line. However, the rural nature of much of the project area limits the total number of noise sensitive receptors that would experience a noise increase during construction.

The SEA determined that the new build portion of the proposed project would meet the Board's environmental analysis thresholds for noise set forth at 49 CFR 1105.7(e)(6). The Board's thresholds for noise analysis are:

- all rail lines where rail traffic would increase by eight or more trains per day, or
- all rail lines for which the gross ton-miles transported annually increases by 100 percent or more.

Based on information provided in DM&E's Application to the Board, indicating a monetary break-even level of rail traffic equal to 8 trains per day increasing over time to as many as 34 trains per day, SEA determined detailed analysis of noise impacts was appropriate for the

Extension Alternatives. Therefore, SEA conducted a detailed evaluation of potential noise impacts from operation of the proposed project.

SEA performed an analysis of the entire length of each of the Extension Alternatives to determine the potential noise impacts of the proposed increases in rail traffic. Figure 4.1-1 provides a comparison of common noise sources to locomotive wayside and horn noise. Based on these levels of noise, SEA calculated the distance (contour) at which the average daily noise level (L_{dn}) would be equal to 65 decibels (dB) on an A-weighted scale (A),[11] or would experience an increase of 3 dBA L_{dn} or greater, as specified in the Board's rules. Distances less than the 65 dBA L_{dn} contour would experience average daily noise levels greater than 65 dBA L_{dn}. Federal agencies, including the Federal Aviation Administration and Department of Housing and Urban Development, consider noise levels up to 65 dBA L_{dn} to be compatible with most noise sensitive receptors. These agencies, as well as the Board, agree that noise levels at or above 65 dBA L_{dn} are adverse. SEA also calculated the 70 dBA L_{dn} contour. The 70 dBA L_{dn} noise level was established by SEA in the Conrail Acquisition, Finance Docket No.33388, as the noise level at and above which mitigation for noise impacts would be considered for that case. It is applied here as a comparison to the number of noise sensitive receptors calculated to experience noise levels of 65 dBA L_{dn} or greater. Additionally, SEA considers noise levels at and above 70 dBA L_{dn} to be significantly adverse.

Noise contours were calculated for both the existing and proposed operating conditions, at proposed coal transportation levels of 20 MNT, 50 MNT, and 100 MNT. These levels of operation were selected because exact levels of train traffic are dependent upon DM&E negotiating contracts for coal transportation. The 20 MNT level is roughly the break-even level for the project and therefore represents the minimum level of rail traffic. DM&E projected in its Application to the Board a level equivalent to 50 MNT shortly after beginning operation, potentially expanding to a maximum of 100 MNT within 7 years. As 50 MNT appears to be a reasonably foreseeable level of operation and 100 MNT was indicated as the maximum level DM&E's system could accomodate, these levels of operation were also evaluated. Contours were calculated for 8 (20 MNT), 18 (50 MNT), and 34 (100 MNT) coal trains per day and considered existing DM&E traffic, as applicable. SEA counted noise sensitive receptors (eg. schools, hospitals, churches, and residences) within the noise contours for the current condition and under each of the proposed operating scenarios.

Noise sources from rail operations include diesel locomotive engine and exhaust noise, wheel/rail interaction noise (or wayside noise), and horn noise. Wayside noise affects all locations in the vicinity of the rail facility. Horn noise is an additional noise source at and in the vicinity of

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11 A-weighted scale considers only those frequencies of noise that are audible to the human ear.

grade crossings where trains are required by law to sound a horn for safety. Both types of noise diminish with distance.

The areas along DM&E's existing rail line and the communities that would experience increases in rail traffic or activity meeting the Board's environmental analysis threshold for South Dakota and Wyoming are listed in Tables 4.4-11 through 4.4-30. Tables 4.4-11 through 4.4-20 show the communities, within their respective counties, with the number of noise sensitive receptors expected to experience noise levels exceeding 65 dBA L_{dn} for each community and the county. County totals are in bold and include both the sensitive receptors within and outside the communities. Noise sensitive receptors within this noise level due to wayside noise, wayside and horn noise, and horn noise only are presented. Tables 4.4-21 through 4.4-30 show the communities, within their respective counties, with the number of noise sensitive receptors exceeding 70 dBA L_{dn}.

Table 4.4-18
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**2**	**2**
Fall River	**0**	**1**	**21**	**22**
Smithwick	0	0	3	3
Heppner	0	0	0	0
Edgemont	0	0	14	14
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-19
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**0**	**0**
Fall River	**1**	**0**	**8**	**9**
Smithwick	0	0	4	4
Heppner	0	0	1	1
Dudley	0	1	2	3
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-20
Alternative D
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	2	**188**	**190**
Wasta	0	2	14	16
Owanka	0	0	3	3
New Underwood	0	0	10	10
Box Elder	0	0	19	19
Rapid City	0	0	142*	142*
Ajax	0	0	0	0
Custer	**0**	**0**	**0**	**0**
Hermosa	0	0	0	0
Fairburn	0	0	0	0
Buffalo Gap	0	0	0	0

Table 4.4-20
Alternative D
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Fall River	**0**	**0**	**0**	**0**
Oral	0	0	0	0
Smithwick	0	0	0	0
Dudley	0	0	0	0
Marietta	0	0	0	0
Weston	**1**	**0**	**0**	**0**
Burdock	0	0	0	0
Dewey	0	0	0	0
Clifton	0	0	0	0
Owens	1	0	0	0
Newcastle	0	0	0	0
Osage	0	0	0	0
Clay Spur	0	0	0	0
Upton	0	0	0	0
Colloid	0	0	0	0
Bentley	0	0	0	0
Crook	**0**	**0**	**0**	**0**
Moorcroft	0	0	0	0
Campbell	**0**	**0**	**0**	**0**
Rozet	0	0	0	0

Table 4.4-21
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**4**	**143**	**851**	**998**
Wasta	0	12	42	54
Owanka	0	3	6	9
New Underwood	0	9	55	64
Box Elder	0	11	131	142
Rapid City	0	108*	615*	723*
Ajax	0	0	1	1
Custer	**0**	**6**	**61**	**67**
Hermosa	0	1	17	18
Fairburn	0	1	12	13
Buffalo Gap	0	4	30	34
Fall River	**0**	**7**	**37**	**44**
Oral	0	4	21	25
Smithwick	0	0	11	11
Dudley	0	1	2	3
Marietta	0	1	0	1
Weston	**8**	**52**	**344**	**404**
Burdock	0	1	2	3
Dewey	0	2	10	12
Clifton	0	0	1	1
Owens	0	0	1	1
Newcastle	7	45	244	296
Osage	0	1	26	27
Clay Spur	0	0	1	1
Upton	0	0	45	45
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**19**	**72**	**91**
Moorcroft	0	19	72	91
Campbell	**0**	**3**	**10**	**13**
Rozet	0	0	7	7

Table 4.4-22
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**2**	**0**	**0**	**2**
Custer	**0**	**0**	**3**	**3**
Fall River	**1**	**2**	**39**	**42**
Smithwick	0	0	7	7
Heppner	0	1	0	1
Edgemont	0	0	27	27
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**1**	**1**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-23
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**2**	**0**	**0**	**2**
Custer	**0**	**0**	**0**	**0**
Fall River	**0**	**4**	**12**	**16**
Smithwick	0	0	8	8
Heppner	0	0	1	1
Dudley	0	2	1	3
Marietta	0	1	0	1

Table 4.4-23
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Niobrara	**0**	**0**	**2**	**2**
Weston	**0**	**0**	**1**	**1**
Darlington	0	0	1	1
Campbell	**0**	**0**	**0**	**0**
Converse	**0**	**0**	**0**	**0**

Table 4.4-24
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**11**	**231**	**1,425**	**1,667**
Wasta	0	17	43	60
Owanka	0	3	12	15
New Underwood	0	11	112	123
Box Elder	0	17	151	168
Rapid City	0	183*	1,105	1,288
Ajax	0	0	1	1
Custer	**0**	**15**	**123**	**138**
Hermosa	0	4	38	42
Fairburn	0	2	19	21
Buffalo Gap	0	9	60	69
Fall River	**0**	**15**	**39**	**54**
Oral	0	7	23	30
Smithwick	0	4	12	16
Dudley	0	2	1	3
Marietta	0	1	0	1

Table 4.4-24
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**17**	**74**	**469**	**560**
Burdock	0	1	2	3
Dewey	0	2	11	13
Clifton	0	0	1	1
Owens	0	1	0	1
Newcastle	16	57	330	403
Osage	0	5	52	57
Clay Spur	0	0	1	1
Upton	0	2	54	56
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**22**	**128**	**150**
Moorcroft	0	22	127	149
Campbell	**1**	**3**	**12**	**16**
Rozet	0	0	8	8

Table 4.4-25
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**2**	**0**	**0**	**2**
Custer	**0**	**0**	**3**	**3**
Fall River	**2**	**9**	**53**	**64**
Smithwick	1	2	8	11
Heppner	0	1	0	1
Edgemont/Dudley	0	3	43	46
Marietta	0	1	0	1

Table 4.4-25
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	0	0	2	2
Campbell	1	1	0	2
Converse	0	0	0	0

Table 4.4-26
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	2	0	0	2
Custer	1	0	0	1
Fall River	1	6	14	21
Smithwick	0	2	7	9
Heppner	0	0	1	1
Dudley	0	2	1	3
Marietta	1	0	1	2
Niobrara	0	0	0	0
Weston	0	0	1	1
Darlington	0	0	1	1
Campbell	3	1	1	5
Converse	0	0	0	0

Table 4.4-27
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**14**	**388**	**1,858**	**2,260**
Wasta	0	24	36	60
Owanka	0	5	12	17
New Underwood	0	20	116	136
Box Elder	0	27	159	186
Rapid City	0	312	1,534	1,846
Ajax	0	0	1	1
Custer	**0**	**23**	**133**	**156**
Hermosa	0	5	45	50
Fairburn	0	4	21	25
Buffalo Gap	0	14	58	72
Fall River	**0**	**28**	**34**	**62**
Oral	0	17	16	33
Smithwick	0	6	10	16
Dudley	0	2	2	4
Marietta	0	1	0	1
Weston	**55**	**126**	**621**	**802**
Burdock	0	2	1	3
Dewey	0	7	6	13
Clifton	0	0	2	2
Owens	0	1	0	1
Newcastle	53	79	421	553
Osage	0	12	70	82
Clay Spur	0	0	1	1
Upton	0	17	103	120
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**57**	**117**	**174**
Moorcroft	0	57	115	172
Campbell	**6**	**4**	**12**	**22**
Rozet	0	0	8	8

Table 4.4-28
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	**0**	**0**	**0**
Custer	**0**	**0**	**0**	**0**
Fall River	**0**	**1**	**11**	**12**
Smithwick	0	0	2	2
Heppner	0	1	0	1
Edgemont	0	0	4	4
Marietta	0	0	1	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-29
Alternative C
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	**0**	**0**	**0**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**0**	**5**	**5**
Smithwick	0	0	2	2
Heppner	0	0	0	0
Dudley	0	0	2	2
Marietta	0	0	1	1
Niobrara	**0**	**0**	**0**	**0**

Table 4.4-29
Alternative C
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-30
Alternative D
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	**1**	**117**	**118**
Wasta	0	0	12	12
Owanka	0	1	2	3
New Underwood	0	0	9	9
Box Elder	0	0	13	13
Rapid City	0	0	52	52
Ajax	0	0	0	0
Custer	**0**	**0**	**0**	**0**
Hermosa	0	0	0	0
Fairburn	0	0	0	0
Buffalo Gap	0	0	0	0
Fall River	**0**	**0**	**0**	**0**
Oral	0	0	0	0
Smithwick	0	0	0	0
Dudley	0	0	0	0
Marietta	0	0	0	0

Table 4.4-30
Alternative D
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Burdock	0	0	0	0
Dewey	0	0	0	0
Clifton	0	0	0	0
Owens	0	0	0	0
Newcastle	0	0	0	0
Osage	0	0	0	0
Clay Spur	0	0	0	0
Upton	0	0	0	0
Colloid	0	0	0	0
Bentley	0	0	0	0
Crook	**0**	**0**	**0**	**0**
Moorcroft	0	0	0	0
Campbell	**0**	**0**	**0**	**0**
Rozet	0	0	0	0

Table 4.4-31
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**54**	**404**	**459**
Wasta	0	2	23	25
Owanka	0	2	3	5
New Underwood	0	2	18	20
Box Elder	0	3	51	54
Rapid City	0	45	308	353
Ajax	0	0	0	0
Custer	**0**	**1**	**22**	**23**
Hermosa	0	1	4	5
Fairburn	0	0	4	4
Buffalo Gap	0	0	14	14

Table 4.4-31
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Fall River	**0**	**1**	**26**	**27**
Oral	0	0	17	17
Smithwick	0	0	6	6
Dudley	0	1	1	2
Marietta	0	0	0	0
Weston	**1**	**0**	**128**	**129**
Burdock	0	0	2	2
Dewey	0	0	8	8
Clifton	0	0	0	0
Owens	0	0	1	1
Newcastle	1	0	79	80
Osage	0	0	12	12
Clay Spur	0	0	0	0
Upton	0	0	17	17
Colloid	0	0	0	0
Bentley	0	0	1	1
Crook	**0**	**2**	**55**	**57**
Moorcroft	0	2	55	57
Campbell	**0**	**0**	**6**	**6**
Rozet	0	0	0	0

Table 4.4-32
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**2**	**17**	**19**
Smithwick	0	0	2	2
Heppner	0	1	0	1
Edgemont	0	0	10	10
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-33
Alternative C
Number of Noise Sensitive Receptors - 70 dBA Ldn for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**3**	**6**	**9**
Smithwick	0	0	2	2
Heppner	0	0	1	1
Dudley	0	1	2	3
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**

Table 4.4-33
Alternative C
Number of Noise Sensitive Receptors - 70 dBA Ldn for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-34
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**3**	**100**	**710**	**813**
Wasta	0	7	32	39
Owanka	0	3	4	7
New Underwood	0	4	42	46
Box Elder	0	8	89	97
Rapid City	0	78	541	619
Ajax	0	0	1	1
Custer	**0**	**3**	**44**	**47**
Hermosa	0	1	11	12
Fairburn	0	0	9	9
Buffalo Gap	0	2	23	25
Fall River	**0**	**6**	**34**	**40**
Oral	0	3	20	23
Smithwick	0	0	9	9
Dudley	0	1	2	3
Marietta	0	1	0	1

Table 4.4-34
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**8**	**24**	**325**	**357**
Burdock	0	1	1	2
Dewey	0	2	10	12
Clifton	0	0	1	1
Owens	0	0	1	1
Newcastle	8	18	237	263
Osage	0	1	20	21
Clay Spur	0	0	1	1
Upton	0	0	39	39
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**9**	**82**	**91**
Moorcroft	0	9	82	91
Campbell	**0**	**2**	**10**	**12**
Rozet	0	0	6	6

Table 4.4-35
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**3**	**31**	**34**
Smithwick	0	0	6	6
Heppner	0	1	0	1
Edgemont	0	0	19	19
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**

Table 4.4-35
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-36
Alternative C
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**4**	**10**	**14**
Smithwick	0	0	6	6
Heppner	0	0	1	1
Dudley	0	2	1	3
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**1**	**1**
Darlington	0	0	1	1

Table 4.4-36 Alternative C Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT				
County and Community	**Number of Noise Sensitive Receptors for 34 Trains**			
	Wayside	**Wayside/Horn**	**Horn**	**Total**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-37 Alternative D Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT				
County and Community	**Number of Noise Sensitive Receptors for 34 Trains**			
	Wayside	**Wayside/Horn**	**Horn**	**Total**
Pennington	**4**	**144**	**1,077**	**1,225**
Wasta	0	12	42	54
Owanka	0	3	11	14
New Underwood	0	10	65	75
Box Elder	0	11	146	157
Rapid City	0	108	811	919
Ajax	0	0	1	1
Custer	**0**	**14**	**77**	**91**
Hermosa	0	3	26	29
Fairburn	0	2	17	19
Buffalo Gap	0	9	30	39
Fall River	**0**	**12**	**34**	**46**
Oral	0	4	21	25
Smithwick	0	4	9	13
Dudley	0	2	1	3
Marietta	0	1	0	1

Table 4.4-37 Alternative D Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT				
Weston	**13**	**67**	**449**	**529**
Burdock	0	1	2	3
Dewey	0	2	11	13
Clifton	0	0	1	1
Owens	0	1	0	1
Newcastle	12	53	341	406
Osage	0	5	31	36
Clay Spur	0	0	1	1
Upton	0	2	46	48
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**21**	**85**	**106**
Moorcroft	0	21	84	105
Campbell	**1**	**3**	**10**	**14**
Rozet	0	0	7	7

Noise sensitive receptors, the majority of which are residences, would be exposed to noise levels of 65 dBA L_{dn} and 70 dBA L_{dn} by each alternative, under each operating level. For Alternatives B and C, these noise sensitive receptors would mostly be found in Fall River County and would primarily only experience noise levels of 65 dBA L_{dn} and 70 dBA L_{dn} due to horn noise. Alternative D would expose a far greater number of noise sensitive receptors to noise levels of 65 dBA L_{dn} and 70 dBA L_{dn}. Like Alternatives B and C, most of these noise sensitive receptors would be exposed to these noise levels due to horn noise. Alternative D would expose large numbers of noise sensitive receptors to these noise levels in Pennington County (primarily in Rapid City), Custer County, Fall River County, Weston County (primarily in Newcastle), and Crook County (primarily in Moorcroft). While Alternatives B and C would result in substantial increases in the number of noise sensitive receptors exposed to an increase in average daily noise levels, Alternative D would result in a significant increase in noise sensitive receptors exposed to adverse levels of average daily noise.

Because communities have become established along the existing DM&E and BNSF rail lines, Alternative D would have significant community impacts as a result of increased noise. This impact would be due to the entire towns of Owanka, Oral, and Rozet being within the 65 dBA L_{dn} contour for horn noise at the 50 MNT level of operation. At the 100 MNT level, these towns, as well as Wasta, New Underwood, Hermosa, Fairburn, Buffalo Gap, Smithwick, Dudley, Dewey, and Moorcroft would also be entirely within the 65 dBA L_{dn} contour for horn noise. By contrast, only Oral and Smithwick would be entirely within this contour for Alternative B at 50 MNT and 100 MNT, and Alternative C would only affect Smithwick in this fashion.

SEA recognizes that the majority of noise generated by trains during operations, results from horn soundings. Train horn soundings are deliberately caused, and in many states, required by law, to enhance the safety of vehicles at grade crossings of active rail lines. SEA understands that horn noise can create an adverse environmental impact and is an annoyance. However, SEA has refrained from requiring mitigation of horn noise in past cases, indicating that "any attempt to significantly reduce [train horn] noise levels at grade crossings would jeopardize safety, which we consider to be of paramount importance."[12] A study by the Federal Railroad Administration (FRA) evaluating the impacts of whistle free crossings in Florida on rail safety provides support for SEA's position. In its study, FRA determined vehicle/train accidents increased between 195 and 500 percent, depending on considerations such as how many accidents whistles would not have prevented and what constituted an accident, at crossings where whistle soundings were banned.[13] Additionally, in a joint study between FRA and the Association of American Railroads (AAR), it was determined that crossings with whistle bans averaged 84 percent more collisions than comparable crossings where whistles were sounded.[14]

Recent Federal legislation, specifically the Swift Act (49 U.S.C. 20153), directs the Secretary of the Department of Transportation (DOT) to develop regulations relating to noise and rail safety measures. FRA is the Federal agency within DOT with primary responsibility for establishing train horn requirements and alternatives. On January 13, 2000, FRA published a Notice of Proposed Rulemaking in the Federal Register that proposes requirements for locomotive horn sounding at grade crossings and a procedure for the establishment of "quiet zones" for train horns. FRA defines a quiet zone as a "segment of rail line within which is situated one or a number of consecutive highway-rail crossings at which locomotive horns are not routinely sounded." FRA's proposal includes establishing an application process for communities to obtain FRA approval to establish quiet zones. Approval would require the community to implement supplemental safety measures, such as four-quadrant gates, directional horns, median

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[12] Surface Transportation Board, Section of Environmental Analysis. *Union Pacific Railroad-Control-Southern Pacific Railroad*, Decision No. 44, Finance Docket No. 32760, August 12, 1996.

[13] Federal Railroad Administration. 1999. Cited in *Use of Locomotive Horns at Highway-Rail Grade Crossings; Proposed Rule*. Docket No. FRA-1999-6439, Notice No. 1. Issued December 16, 1999. Federal Register, January 13, 2000.

[14] Ibid.

barriers, temporary road closures, or other measures determined by FRA to be effective at enhancing grade crossing safety. FRA has prepared a Draft EIS as part of its proposed rulemaking. Following completion of the EIS process, FRA will publish the final rule. The final rule will take affect one year after publication of the final rule. FRA is continuing the rulemaking process, however, no dates for publication of the final rule have been proposed. SEA believes that FRA's final regulations will provide a safe, effective means to address horn noise concerns.

4.4.9.2 Vibration

Operation of the proposed project would likely cause ground vibration. This vibration would be caused by the operation of trains over the newly constructed rail line and would travel outward from the rail bed. These ground vibrations are a concern for several reasons. These include:

- structural damage to buildings and residences
- concern for structural damage
- nuisance or inconvenience
- affects on sensitive equipment, such as precision manufacturing tools, electron microscopes, magnetic resonance imaging systems, bench microscopes, micro-balances, laer interferometers, and magnetometers.

Ground vibration would occur due to rail traffic on the newly constructed rail line. Ground vibrations are highly dependent on specific soil conditions (shear stiffness, uniformity, depth to rock, percentage of clay, sand, loam or other soil particles), which are highly variable. The magnitude of these vibrations would be dependent on the size and types of trains, operating weight of these trains, and the characteristics and types of soils adjacent to the rail line. The magnitude of vibration would be the same for all levels of operation because it is caused by only a single train event. The magnitude of vibration would not increase due to additional trains, only the frequency of the vibration event would increase as train numbers increased. SEA conservatively determined, based on previous vibration studies, that ground vibration could be sufficient to cause structural damage to buildings located within 100 feet of the rail line (Appendix F). Table 4.4-38 provide the number of structures within this distance that could be subject to structural damage from ground vibration. These structures could experience minor damage such as cracking of walls or foundations and breakage of items falling from tables, walls, or shelves. Additionally, individuals occupying these structures would experience vibration at levels likely to cause disturbance of daily life and be considered a nuisance. Such disturbances could include rattling of windows, items on tables, walls, and shelves; and interuption of sleep, conversation, or listening activities (television, radio, etc.).

Beyond 100 feet, ground vibration would be expected to lessen to a magnitude that would not result in structural damage. However, SEA determined, based on previous studies of rail vibration (Appendix F) that, between 101 and 200 feet, ground vibration could be of sufficient magnitude to cause concern that structural damage could occur. Structural damage within this range would be unlikely. Individuals could experience concern and frustration due to worrying about potential damage. Quality of life may be reduced as a result of frequent vibration events and the potential disturbance and inconvenience associated with rattling of windows, walls, pictures, and items on shelves, and minor damage that may occur to these items.

Ground vibration is anticipated to extend outward from the existing rail line for several hundred feet. Beyond 200 feet, ground vibration may still be above the level of human perception. SEA determined that structures between 201 and 400 feet from the rail line would perceive some level of ground vibration. This vibration would present an inconvenience of annoyance to individuals experiencing it. However, it would not be expected to cause any structural damage or significant reduction in individuals' quality of life.

Ground vibration, even at levels below those perceived by humans, may effect sensitive equipment such as that found in hospitals and major medical facilities. Such facilities have not been identified along any of the proposed alternatives. Therefore, no impacts to the use or operation of sensitive equipment are anticipated to occur from any of the Extension Alternatives.

Table 4.4-38
Rail Line Extension Alternatives
Structures Potentially Impacted by Vibration

Alternative	0-100 feet	101-200 feet	201-400 feet
Alternative B	0	1	1
Alternative C	2	2	3
Alternative D	3	11	61

4.4.10 BIOLOGICAL RESOURCES

4.4.10.1 Vegetation

This Section discusses the impacts of construction and operation of the proposed project alternative to vegetative communities found throughout the project area. Impacts to vegetative species classified as endangered, threatened, or proposed for such classification are discussed in Section 4.4.12.

Impacts to vegetation would occur primarily as a result of conversion of vegetated land to rail line right-of-way. During construction, vegetation would be cleared from the right-of-way, resulting in a reduction in the amount of those vegetative communities present within the right-of-way. Local reductions in vegetation diversity could occur. Native vegetative communities within the right-of-way would be lost. Trees and shrubs (uncommon in the project area and considered an important community by state agencies and Federal land managers) within the right-of-way would be cleared. Should construction activities be required outside the right-of-way, additional areas of vegetation could be damaged or destroyed. Construction of access roads, material staging and laydown yards, mancamps, and borrow and soil stockpile areas outside the rail line right-of-way would also result in damage or loss of vegetation.

Following construction, disturbed areas of the right-of-way would be reclaimed. Once the rail line is completed, vegetation would not be allowed to grow in the rail bed ballast and rails, and would probably be maintained with low-growing herbaceous forms within the rail bed grade and associated ditches. Those areas would be lost to reestablishment of native vegetation over the long-term. From the outer margins of the rail bed ditch to DM&E's right-of-way edge opportunities may exist for revegetating disturbed areas for native plant species as long as growth forms meet safety requirements for the operating railroad. But, from DM&E's right-of-way to the outer edge of disturbed construction zones, disturbed vegetation would be reclaimed to land owner specifications. Vegetation from adjacent right-of-way areas would be anticipated to reestablish within these areas of the right-of-way.

The success of reclamation efforts and reestablishment of vegetation within the right-of-way would depend on treatment and handling of topsoil during construction, seed mixes selected, soil characteristics, and availability of moisture. Problem areas that may be difficult to revegetate include soils with limiting chemical or physical characteristics that restrict plant establishment because of nutrient imbalances or limits the soils moisture storage capacity. Reclamation and reestablishment of herbaceous vegetation could take several years to return to preconstruction conditions, may never return to the preconstruction condition, or may exceed the preconstruction condition in quality, quantity, and composition of vegetative cover. Impacts to vegetation communities dominated by shrub and tree species are more long-term since reestablishment of these species takes many more years compared to herbaceous or grassland type communities. For example, big sagebrush plant community may take 10 to 20 years, woodlands 25 to 75 years, and riparian and woody draws take10 to 60 years to become established to preconstruction condition. Impacts to these vegetation types may adversely affect wildlife species that are, in some way, dependent on them.

Disturbed areas that become heavily infested with weeds could also hinder successful revegetation causing long-term impacts. Most noxious weeds are opportunistic, introduced species which become particular problems when the native communities are disturbed.

Additionally, in areas maintained as a fire break along the right-of-way, plowing, mowing, or application of herbicides would prevent establishment of significant vegetative cover. Establishment of noxious weeds within the right-of-way would be possible due to disturbance of large areas of soil. Once established in the right-of-way, these weeds would compete with other species within the right-of-way and provide a source of seed for spreading into adjacent areas. Fires resulting from rail line operation and maintenance activities would damage or destroy adjacent vegetation, potentially resulting in new communities or noxious weeds becoming established in fire-disturbed areas.

Alternative B (Proposed Action)

In South Dakota, this alternative passes through approximately 92.4 miles (approximately 4,480.0 acres) of grasslands, 16.1 miles (approximately 780.6 acres) of cropland and pasture, and 2.2 miles (approximately 106.7 acres) of coniferous woodlands and 0.9 mile (approximately 43.6 acres) of wetlands. In Wyoming, this alternative passes through approximately 128.0 miles (approximately 6,206.1 acres) of grasslands, 7.7 miles (approximately 373.3 acres) of cropland and pastures, and 14.6 miles (approximately 707.9 acres) of big sagebrush shrublands, and 0.5 miles (approximately 24.2 acres) of deciduous woodlands, and approximately 0.4 mile (19.5 acres) of wetlands.

Alternative C (Modified Proposed Alternative)

In South Dakota, Alternate C passes through approximately 106.7 miles (approximately 5,173.3 acres) of grasslands, 18.2 miles (approximately 882.4 acres) of cropland and pastures, 0.7 mile (approximately 33.9 acres) of deciduous woodlands, and 3.0 miles (approximately 145.4 acres) of coniferous woodlands, and 1.0 mile (approximately 48.2 acres) of wetlands. In Wyoming, Alternative C passes through approximately 110.3 miles (approximately 5,347.9 acres) of grasslands, 9.0 miles (approximately 436.4 acres) of cropland and 11.3 miles (approximately

547.9 acres) of big sagebrush shrublands, 0.3 miles (approximately 14.5 acres) of coniferous woodlands, and 0.3 mile (approximately 13.6 acres) of wetlands.

Alternative D (Existing Corridors Alternative)

In South Dakota, this route passes through approximately 119.2 miles (approximately 2,889.7 acres) of grasslands, 42.5 miles (approximately 1,030.3 acres) of croplands and pastures, 0.5 miles (approximately 12.1 acres) of deciduous forest, and 2.3 miles (approximately 55.7 acres) of coniferous forest, and 0.4 miles (approximately 9.4 acres) of wetlands. In Wyoming, this route passes through approximately 68.8 miles (approximately 1,667.9 acres) of grasslands, 8.5 miles (approximately 206.1 acres) of croplands and pastures, and 80.7 miles (approximately 1,956.4 acres) of big sagebrush shrublands. In addition, the route passes through 7.0 miles (approximately 169.7 acres) of coniferous woodlands, and 1.2 miles (approximately 31.6 acres) of wetlands.

4.4.10.2 Wildlife

This Section discusses the potential impacts to wildlife resources throughout the project area for the proposed project alternatives from construction and operation of a new rail line. Impacts to species classified as Federally endangered, threatened, or proposed for such listings are discussed in Section 4.4.1.0.4

A wide variety of wildlife occur throughout the project area. Specific impacts to the different types of wildlife vary between the different categories of wildlife and between alternatives. The impacts expected from each Extension Alternative are discussed below for each category of wildlife. The general types of impacts to wildlife from construction and operation of the proposed project alternatives would include:

- Disturbance during construction and operation due to noise and human activities leading to abandonment of habitat, even suitable habitat outside the rail line right-of-way.
- Alteration or impedence to big game movement and migration patterns due to the barrier provided by rail line fences and the rail bed.
- Mortality and injury caused by construction vehicles, equipment or train/animal collisions.
- Increased hunting pressure and possibly illegal harvesting and poaching due to local population increases from the influx of construction workers.
- Increased competition for forage with livestock due to reduction in habitat.
- Direct and indirect loss of game and non-game wildlife habitats, including nesting and young rearing areas; foraging and watering sites; escape, thermal and hiding cover; and resting or loafing areas due to conversion of current habitat to rail line right-of-way.

- Displacement of wildlife away from suitable or preferred habitats due to construction and human disturbance.
- Disturbance and disruption, particularly to nesting raptors and other birds, due to noise and activity generated by construction activities and passing train traffic.
- Decline in overall numbers of certain species due to lost habitat, fragmented habitat, mortality, and/or continued disturbance.
- Potential contamination of habitats or exposure to hazardous materials due to increased train traffic and new rail lines increasing the potential for derailments and diesel fuel spills.
- Establishment of noxious weeds and undesirable plant species in the rail line right-of-way allowing them to encroach on adjacent areas, reducing desirable forage in these areas.

4.4.10.2.1 Big Game

The only measurable impact to big game is the amount of habitat lost due to conversion to rail line right-of-way. Habitats used by big game vary seasonally. Therefore, seasonal ranges are delineated for each species. Generally, yearlong or summer ranges make up the majority of a species overall range. While necessary for the health of the population, the amount of these ranges and the lack of stresses (such as lack of food, cold, hunting pressure) make these habitats less important overall. Winter ranges, particularly crucial or severe winter range, are often vital to the survival of a particular population as they provide necessary relief from severe conditions such as lack of food or water and severe weather. Such habitats generally comprise only a small portion of a big game species overall range and their loss is therefore more significant. In Wyoming, pronghorn, mule deer, white-tailed deer, and elk seasonal ranges would be affected by each of the alternatives. Likewise, habitats used by pronghorn and deer (white-tailed deer and mule deer) would be affected in South Dakota.

The functions and value of seasonal big game ranges may be impaired by construction and operation of the proposed project. Disturbances from construction activities and operating trains during winter stress periods can lead to increased energy expense and increased big game mortality (Hobbs, 1989). Such disturbances during construction would be unlikely as construction during winter months would be limited to scattered crews installing bridges and culverts. As these activities would be limited to small areas, big game using the vicinity would be able to seek refuge in other areas. Additionally, crucial and severe winter range is generally necessary during only the most severe winter conditions which may not occur every year. During severe weather, it is likely construction activities would be halted so crews would not be out, allowing big game to be undisturbed during the more severe conditions. However, during rail line operations, trains operating at random times day and night could cause significant wildlife disturbances during high-stress periods for big game.

Big game would also likely be disturbed by passing trains throughout the year. Some individuals would likely adapt to passing trains and be relatively undisturbed, seeking only to move away a sufficient distance to feel secure. Some reduced use of suitable habitat and forage adjacent to the rail line may occur. However, as noted above, during severe conditions, the added stress of passing trains to animals otherwise adapted to them may be harmful.

In addition to disturbance from human activities and noise associated with the project alternatives, big game are likely to be killed by vehicle and train traffic. Increased traffic during construction would increase the likelihood of a vehicle/animal collision. Once the project is operational, it is likely that a new railroad passing through big game habitat in the proposed project area would lead to train/animal collisions. More mortalities are expected:

- during winter when animals are concentrated in large groups than in summer when they are dispersed,
- with higher train traffic volume than with fewer trains,
- during night when animals may be more active than during daytime, and
- with higher train speeds (as with empty west-bound trains) than slower trains loaded with coal.

Also, big game are most likely to be killed in areas where they have little or no escape away from the tracks. Such situations could include areas where the rail line passes through a cut and where right-of-way fences are constructed close to tracks. While fences may inhibit some animals from moving onto the tracks and rail bed, they also inhibit animals from reaching areas on the other side, thereby trapping them within the rail line right-of-way as well as isolating and fragmenting portions of their habitats found on opposite sides of the rail line. Fences could pose a significant barrier to big game use of habitats along the Cheyenne River where animals are expected to be highly motivated to move to water from feeding areas or shelter/cover in upland habitats. Fences can lead to under-utilization of habitat, leading to loss of habitat function. Such impact would be especially acute if animals were prevented from reaching winter or severe winter relief ranges during critical winter periods. Each of the alternatives would have similar impacts, differing in the degree of impact depending on the number of miles of each seasonal range crossed.

Table 4.4-39 lists the number of miles of big game seasonal ranges crossed by each alternative.

Table 4.4-39
Comparison of Big Game Habitat between the Alternatives

	Alternative B (miles)	Alternative C (miles)	Alternative D (miles)
South Dakota			
Pronghorn			
Winter Range	4.0	4.2	0
Yearlong Range	10.3	26.6	25.0
Mule Deer/White-tailed Deer			
Winter Range	29.8	23.5	0
Yearlong Range	71.7	54.0	61.5
Wyoming			
Pronghorn			
Winter-Yearlong Range	39.6	40.5	73.8
Yearlong Range	109.3	88.3	84.3
Severe Winter Relief Range	2.3	2.4	2.5
Winter Range	0	0	5.2
Mule Deer			
Winter Yearlong Range	11.0	9.0	36.8
Yearlong Range	123.5	103.4	108.3
Elk			
Winter Yearlong Range	9.7	4.7	4.7
Yearlong Range	21.8	21.4	16.5
Crucial Winter Range	0.4	2.5	2.5

Although Alternative D would affect the most miles of pronghorn winter range, approximately 73.8 miles, its location within and adjacent to existing rail rights-of-way would reduce the actual acres (1,789.1 acres) of this range lost. Alternative C would result in the greatest loss of pronghorn winter range in both South Dakota and Wyoming, approximately 44.7 miles (2,167.3 acres). Alternative B would result in the most loss of deer and elk winter range, approximately 40.8 miles (1,978.2 acres) and 9.7 miles (470.3 acres), respectively. For elk, both

Alternative C and D would impact more crucial winter range than Alternative B, 2.5 miles (121.2 acres)[15] compared to 0.4 miles (19.4 acres) for Alternative B.

4.4.10.2.2 Game Species

Upland Game Birds

Construction and operation of the railroad through South Dakota and Wyoming would contribute to existing habitat fragmentation of sage grouse populations. The decline of sage grouse throughout the west is of increasing concern. Reasons for their decline have been attributed to: conversion of sagebrush-grasslands to agriculture; herbicide and mechanical treatments to convert sagebrush to pastureland for livestock; livestock grazing that removes concealing vegetation revealing nest sites which could expose them to predation; mining and energy developments; creation of reservoirs that eliminate riparian zones utilized by sage grouse broods, expansion of human settlements into sage grouse habitats and; fragmentation of habitats by fence lines, highways, and power lines. Mating displays by male sage grouse as well as male sharp-tailed grouse involve acoustic signals coupled with visual displays (Eng *et* al, 1979; Vehrencamp and Bradbury 1989; Gibson and Bradbury 1985; Gibson, 1989, 1992, 1996; Gratson 1993) so that constant noise could interfere with females' attraction to males' displays.

Existing background noise on the project area in both states is expected to be similar to EPA's "farm in valley" noise category which is about 39 dBA in daytime and 32 dBA at night. Noises increases associated with construction could disrupt mating displays on nearby leks. However, these increases would be temporary during the construction of the rail line in the vicinity of the lek(s). If construction activities occur in the vicinity of a lek, but outside the breeding season, such disturbances would not be expected.

Noise increases associated with the introduction of train traffic would be long-term for the life of the project. SEA's estimates of the distance at which noise from train horn soundings and wayside noise would diminish to background daytime noise levels (39 dBA) ranges from 39,000 feet (7.4 miles) for horn noise to 23,000 feet (4.4 miles) for wayside noise. Attenuation distances are much greater for noise to diminish to nighttime background levels (32 dBA), estimated to be 49,000 feet (9.3 miles) for horn noise and 32,000 feet (6.1 miles) for wayside noise.

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[15] Elk crucial winter range crossed by Alternatives C and D occurs in an area where these alternatives share the same alignment and involve new construction. For analysis purposes, because neither alternative would be adjacent to an existing rail line, a 400-foot average right-of-way is used to estimate the amount of habitat lost.

Noise levels of 60 dBA are comparable to EPA's "noisy urban residential" category. Wayside noise would reach that level at 5,700 feet (1.1 mile) from the tracks while horn noise would attenuate to 60 dBA approximately 16,000 feet (3.0 miles) away. There are numerous sage grouse leks but fewer known sharp-tailed grouse leks within those distances of the proposed alternatives in both states. Numbers of leks potentially impacted by noise increases are included below for each alternative.

In addition, there are wild turkey roosts along the Cheyenne River in South Dakota and mourning doves and pheasants are likely to nest anywhere along the proposed alternative, particularly in South Dakota. Wild turkey strutting and courtship areas during the toms' "gobbling" season exist throughout woody draws, the Bad and Cheyenne River corridors, and riparian zones of tributaries of the Bad and Cheyenne Rivers in South Dakota. Responses by these upland game bird species to the loss of habitat and levels of noise and activity associated with the construction of a new rail line is difficult to predict. However, they would likely be similar to impacts described in Section 4.3.11. Construction noise and disturbance would displace individuals from the right-of-way and adjacent areas. Any habitat for roosting, nesting, or foraging within the right-of-way would be lost, as would any nests present at the time of construction. Females hesitant to leave a nest of eggs or chicks could also be lost. During operation of the rail line, upland birds would likely move back into adjacent areas along the rail line, particularly if suitable habitat is available. Some mortality to young birds and chicks may periodically occur due to collisions with passing trains. Individuals would likely adapt to passing trains and be generally undisturbed by them. However, during severe weather, disturbance from passing trains, causing birds to flush from cover or roosts could result in excessive stress leading to mortality. However, as trains would occur daily, individuals disturbed by trains would be expected to select habitats in other areas, minimizing the potential for impacts to upland birds.

Game birds can also be subject to direct mortality during construction and operation of any alternative. Sage grouse, pheasants, wild turkeys, mourning doves, and sharp-tailed grouse nest on the ground in situations varying in degrees of vegetation cover. Birds incubating eggs and broods of chicks would be killed if project-related vehicles drive over nests. Birds could also be struck by trains (Bennett, 1991).

Alternative B (Proposed Action)

Short-term construction surface disturbances and associated noise occurring when sage grouse and sharp-tailed grouse are attending leks could inhibit courtship and reproduction. There are 5 sage grouse and 6 unidentified leks within 1.0 mile, and 12 sage grouse and 18 unidentified leks within 2.0 miles of Alternative B in South Dakota. In Wyoming there are 14 sage grouse leks within 1.0 mile and 26 sage grouse leks within 2.0 miles of this alternative. Alternative B would cross approximately 14.6 miles (707.9 acres) of sagebrush habitat.

In South Dakota, wild turkeys utilize the riparian zones along the Cheyenne River and its tributaries during courtship. Eight "gobbling" toms with harems were observed within 0.5 to 1.0 mile of Alternative B during 1999 aerial surveys for raptors. More than those gobbling sites probably occur along this route. The response of wild turkeys during courtship and nesting to construction activities and noises are unknown, but impacts, if they occur, are most likely at sites proximate to or through riparian zones and ponderosa pine-juniper woodlands. Approximately 2.2 miles of woodland habitat is crossed by Alternative B, all in South Dakota. Nesting wild turkeys, sage grouse, pheasants, mourning doves, and sharp-tailed grouse could be impacted by construction within the various undisturbed habitats that occur along the right-of-way.

Alternative C (Modified Proposed Action)

In South Dakota there are 2 unidentified leks within 0.25 mile, 6 sage grouse and 12 unidentified leks within 1.0 mile, and 3 sage grouse and 23 unidentified leks within 2.0 miles of Alternative C. In Wyoming there are 2 sage grouse leks within 0.25 mile, 10 sage grouse within 1.0 mile, and 19 sage grouse leks within 2.0 miles of this alternative. Alternative C would cross approximately 11.3 miles (547.9 acres) of sagebrush habitat.

Six "gobbling" toms with harems were observed between 0.5 to 1.0 mile of Alternative C during 1999 aerial surveys for raptors. More than those probably occur along the route. Impacts would be similar to those discussed for Alternative B, however, Alternative C would impact more miles of woodland habitat, approximately 4.4 miles more than Alternative B.

Alternative D (Existing Corridors Alternative)

There are 6 sage grouse leks within 1.0 mile and 11 sage grouse leks within 2.0 miles of Alternative D in South Dakota. In Wyoming there are 2 sage grouse leks within 0.25 mile, 9 sage grouse leks within 1.0 mile, and 20 sage grouse leks within 2.0 mile of this alternative. Alternative D would cross approximately 80.7 miles (1,956.4 acres) of sagebrush habitat.

Seven "gobbling" toms with harems were observed within 0.5 to 1 mile of Alternative D during 1999 aerial surveys for raptors. Alternative D would cross the most woodland habitat, approximately 7.0 miles. However, it would be expected to have similar or less impacts to wild turkeys than the other alternatives due to it occurring within or adjacent to existing, active rail line right-of-way for the majority of its length.

Waterfowl

Potential impacts to waterfowl due to construction and operation of the Extension Alternatives would be most likely:

- during the nesting period, and
- where the proposed route is near the Cheyenne River or other perennial sources of water in South Dakota and Wyoming.

Waterfowl species nest in a variety of locations. However, most select upland habitats near permanent water for nest sites as these areas provide nesting material and cover. After the eggs hatch, the hens move the brood to water for food and safety. During the nesting period, construction activities across upland areas throughout the project area and along all of the alternatives, have the potential to destroy nests, eggs, chicks, and hens within the right-of-way. Construction activities along a particular portion of an alternative route occurring before or after the nesting season would avoid these impacts. However, as waterfowl may renest throughout the summer, it is likely some could be nesting within the right-of-way even during construction in mid-summer. Habitat within the right-of-way would be lost. Nesting birds in adjacent areas may abandon their nest due to increased human activity and noise during construction. Construction across streams, rivers, and wetlands may cause waterfowl to abandon these areas. If young or molting adults unable to fly are disturbed, they could become more susceptible to predation. Accidental release of oils and other petroleum products into the Cheyenne River, its tributaries, or wetlands also could adversely affect waterfowl by contaminating the water and food supply.

During rail line operation, waterfowl may avoid areas within and adjacent to the rail line due to disturbance from passing trains. Others would have adapted to the disturbance and select to nest in these areas. Some mortality to adults and chicks may occur if they wander onto the rail line when traveling to water. If spills of hazardous materials occur during train movements and enter wetlands or waterways, waterfowl could be lost from water or food contamination.

Alternative B (Proposed Action)

The distance that the right-of-way for Alternative B would be within 0.5 mile and 1.0 mile and the number of locations and total distance where Alternative B would be within 500 feet of the Cheyenne River and its perennial tributaries in South Dakota and Wyoming provide some indication of the level of impact construction could have to waterfowl inhabiting these drainages. Approximately 128.8 miles of Alternative B would be within 1.0 mile of a perennial stream, 85.0 miles would be within 0.5 mile, and 21.9 miles would be within 500 feet of a perennial stream. Alternative B would cross 20 perennial and 623 intermittent streams and convert over 62.1 acres of wetland to rail line right-of-way. There is no information about the levels of actual waterfowl use of these drainages but observations indicate they are used by various species during migration and for nesting. Alternative B would also convert approximately 11,840.0 acres of suitable nesting habitat to rail line right-of-way.

Alternative C (Modified Proposed Action)

Approximately 93.4 miles of Alternative C would be within 1.0 mile of a perennial stream or river, 58.5 miles would be within 0.5 mile, and 20.8 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternative B. Alternative C would have 14 perennial and 520 intermittent stream crossing and convert 62.2 acres of wetland and 11,840.0 acres of potential nesting habitat to rail line right-of-way.

Alternative D (Existing Corridors Alternative)

Approximately 45.1 miles of Alternative D would be within 1.0 mile of a perennial stream or river, 29.9 miles would be within 0.5 mile, and 13.5 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternatives B and C. Alternative D would cross 68 perennial and 707 intermittent streams and convert 40.7 acres of wetland and 5,794.0 acres of potential nesting habitat to rail line right-of-way. However, as noted previously, 237 of these crossings are existing and the majority of the habitat lost would be within or adjacent to existing rail line right-of-way.

<u>Small Game and Furbearers</u>

Small game mammals, such as desert cottontails, are most likely to be impacted during construction. Since many small game mammals and furbearers are relatively small and nocturnal, they are susceptible to being killed by vehicles. Increased traffic from construction vehicles during the early morning and evening hours would likely result in some mortality. Habitat for these species within the right-of-way and at stream crossings would be lost during construction. Construction disturbance may drive these species into areas further removed from the rail line.

Once constructed, the operation of trains would likely result in mortality to individuals of these species, particularly the more terrestrial and mobile ones such as cottontail, fox, coyote,and jackrabbit. Since terrestrial furbearers (fox, coyote, badger) are carnivores, they are likely to be attracted to carrion of big game and other wildlife killed by trains during operation. Animals attracted to or feeding in the rail line right-of-way are likely to themselves become casualties. As aquatic animals, river otter, beaver and muskrat could be adversely affected by accidental release of petroleum products during construction or operation; since their abilities to thermoregulate are severely hampered if fur becomes coated with oil (McEwan *et al.*, 1974).

Small game and furbearers are generally highly mobile and wide ranging, occurring in areas of suitable habitat. As suitable habitat for these species occurs along each of the Extension Alternatives, individuals along the alternatives would be capable of moving to other areas, and individuals from distances in excess of a mile or more would be capable of coming in contact with any of the alternatives, impacts to small game and furbearers were determined to not differ substantially between alternatives. The greatest impact to these species would likely be concentrated along those portions of the alternatives where they follow the Bad River, in the case of Alternative D, and the Cheyenne River, Alternatives B and C. However, impacts would occur along the entire portions of the alternatives. Alternative D has the potential to have a greater overall impact due to its greater length and creating two parallel rail lines to be crossed.

4.4.10.2.3 Non-Game Species

Amphibians and Reptiles

Because they are relatively immobile, amphibian and reptile species found within the right-of-way would likely be killed by construction activities. Those avoiding death would be displaced during construction due to construction activities and loss of habitat. Potential spills of contaminants (diesel fuel, lubricating oil, etc.) associated with construction could impact these species. However, it is anticipated that amphibians and reptiles would return once construction is completed and the right-of-way becomes revegetated. Increased vehicular traffic on roadways during construction would likely increase incidental mortality. Some mortality from passing trains or individuals becoming trapped between rails is also expected.

The distance that the right-of-way for the Extension Alternatives would be within 0.5 mile and 1.0 mile and the number of locations and total distance where Alternative B would be within 500 feet of the Cheyenne River and its perennial tributaries in South Dakota and Wyoming provide some indication of the level of impact construction could have to amphibians as these species are dependent on water. Reptiles could occur anywhere along the Extension Alternatives. Therefore, the total distance of these alternatives provides the main indication of the potential level of impact, with the longer alternatives having potentially more impact.

Alternative B (Proposed Action)

Approximately 112.0 miles of Alternative B would be within 1.0 mile of a perennial stream, 74.0 miles would be within 0.5 mile, and 19.1 miles would be within 500 feet of a perennial stream. Alternative B would cross 20 perennial and 623 intermittent streams and convert over 62.1acres of wetland to rail line right-of-way. Alternative B would include construction of approximately 265.8 miles of new rail line.

Alternative C (Modified Proposed Action)

Approximately 81.0 miles of Alternative C would be within 1.0 mile of a perennial stream or river, 50.0 miles would be within 0.5 mile, and 20.8 miles would be within 500 feet of these. Alternative C would have 14 perennial and 520 intermittent stream crossing and convert 62.2 acres of wetland to rail line right-of-way. Alternative C would include construction of approximately 253.8 miles of new rail line.

Alternative D (Existing Corridors Alternative)

Approximately 46.0 miles of Alternative D would be within 1.0 mile of a perennial stream or river, 30.0 miles would be within 0.5 mile, and 13.5 miles would be within 500 feet of these. Alternative D would cross 68 perennial and 707 intermittent streams and convert 40.7 acres of wetland to rail line right-of-way. Alternative D would include construction of approximately 233.2 miles of new rail line.

<u>Songbirds</u>

The degree to which anticipated noise levels displace non-game birds from habitats adjacent to the railroad is unknown and undoubtedly varies by species and local conditions. Abandonment of occupied habitats within some distance of the railroad is likely, particularly by nesting birds. Sound attenuation though, is likely to be greater in woods than grasslands due to trees absorbing and deflecting sound, and the distance of noise effects on breeding birds could be greater in grasslands than in woodlands.

Passerine birds that are obligate shrub-steppe or riparian woodland (cottonwood and willow) nesting species would be most affected by loss of shrubs and riparian woodlands and fragmentation of shrub-dominated and woodland habitats as these habitats are limited in the project area. Songbirds using other habitats would be relatively unaffected by construction as grassland and sagebrush shrublands are abundantly available. Short-term impacts include loss of nests within the right-of-way for both tree and ground nesting species during construction. Noise during construction is expected to temporarily disturb songbirds causing them to avoid the right-of-way and possibly adjacent areas. Shrub-nesting songbirds would experience a loss of habitat and disturbance to adjacent shrublands, many of which may become unsuitable due to their being fragmented into small sizes that would not provide adequate cover or security for nesting birds.

As these habitats take many years (10 to 75 years) to reestablish, their loss could result in a significant reduction in the number of these species nesting in the area for many years. All of the proposed alternatives would cross less than 1.0 mile of riparian shrub- and woodlands. Alternative B would cross 2.2 miles of woodlands (106.7 acres) and 14.6 miles (707.9 acres) of shrubland; Alternative C would cross 4.0 miles (11.9 acres) of woodlands and 11.3 miles (547.9 acres) of shrubland; and Alternative D would cross 9.8 miles (237.5 acres) of woodlands and 80.7 miles (1,954.4 acres) of shrubland.

Operation and maintenance of the rail line is not expected to have much of an impact on songbirds as many species have adapted to human activity and human disturbances such as roadways and rail lines. Revegetation of the right-of-way would provide nesting and cover habitat for a variety of species, potentially of higher quality than adjacent areas, particularly those subject to grazing.

Shorebirds

Shorebirds use wetlands, uplands, and areas along rivers and streams along each of the Extension Alternatives. Impacts to shorebirds would be similar to those discussed previously for waterfowl.

Small Mammals

The only certain impact to small mammals by construction and operation of any of the alternatives is loss of habitat and mortality. Effects would be especially acute for those species restricted to very limited habitats, including cottonwood-riparian, shrub-dominated woody draws, and coniferous woodlands in the project area. Loss of these habitats could be significant to local populations of species dependent on them as discussed previously for songbirds also dependent upon them. Mortality would likely occur during construction as these species are less mobile and less capable of avoiding construction equipment than their larger, small game and furbearer relatives. Many would likely be lost in their burrows during earthmoving activities. While local populations of species dependent on limited habitats could be significantly reduced, other species would be expected to quickly repopulate disturbed areas due to their high reproductive potentials. Mortality could continue to occur during rail line operation from individuals being hit by trains or becoming trapped between the rail, thus being susceptible to predation and exposure. Overall, impacts to small mammals are not anticipated, except to those species dependent on shrub- and woodlands. Impacts to these species would be related to the amount of these habitats affected by each alternative, as described under songbirds.

Raptors

The construction and operation of any of the Extension Alternatives has the potential to impact various species of raptors in the project area. Noise and human activity during construction may disturb nesting, roosting, and foraging birds. Species with nests in the right-of-way, both on the ground and in trees, would have their nests destroyed during construction activities. Nests in nearby adjacent areas may be abandoned or go unused due to construction related disturbances. Operation of the rail line alternatives would continue to produce noise and human activity disturbances, potentially causing raptors to abandon suitable nests or nesting sites near the rail line. Mortality to raptors could occur, particularly if flying low across the rail line in search of prey or if feeding on carrion along the rail line.

In their study of responses by nesting ferruginous hawks to human disturbances, White and Thurow (1985) concluded that 90 percent of all nesting adults would not flush from nests if the disturbance was more than 250 meters (820 feet) away. The researchers cautioned, though, that distances of effect would expand when prey are scarce. During these times ferruginous hawks must spend more time searching for prey and appear to be less tolerant of disturbances (White and Thurow, 1985).

Impacts to nesting golden eagles, prairie falcons, red-tailed hawks, northern harriers and American kestrels would be similar to those discussed for ferruginous hawks. However, all of these raptor species are somewhat adaptable to human disturbance whereas ferruginous hawks seem to lack such adaptability. During rail line operation, certain individual pairs of raptors would be expected to adapt to the presence of operating trains. These individuals would likely nest in suitable habitat adjacent to the right-of-way, provided they have an adequate buffer for security. Some disturbance to adults and young may occur, however, both would be constantly exposed to passing trains and over time would be undisturbed by them. Red-tailed hawks and golden eagles remained in home ranges when exposed to military training activities (Andersen *et al.*, 1990) and blasting did not adversely affect prairie falcon productivity (Holthuijzen *et al.*, 1990). Parent birds can desert eggs or young but the potential for nest desertion varies between raptor species and is more likely early in the nesting season than after young have hatched (Suter and Jones, 1981).

Other potential effects of disturbance include damage to eggs and young by frightened adults, cooling, overheating and loss of moisture from eggs or young if adult birds remain away from nests for too long, missed feedings of chicks, premature fledging of older nestlings, and increased exposure to predators if adults leave nests unattended (Fyfe and Olendorff, 1976; Grier and Fyfe, 1987). Individuals nesting near the rail line would be at increased risk of being stuck by a train when taking off from a nest or landing. This would be of particular concern for ground nesting raptors, like ferruginous hawks, that may nest in or adjacent to the right-of-way.

Project activities are not expected to displace wintering golden eagles and rough-legged hawks from available hunting grounds. However, these species show greater flushing response to humans walking than to approaching vehicles. Wintering rough-legged hawks when perched are most sensitive to vehicles within 550 feet while wintering golden eagles tended to not respond to vehicles (Holmes *et al.*, 1993). Impacts to wintering raptors are expected to be minor since prey is expected to remain available throughout the area and construction during winter would be limited to scattered installation of stream crossing structures. However, some mortality may occur due to raptors using carrion along the rail line, particularly younger birds that may be less skilled at finding food.

No impacts to peregrine falcons are anticipated since there is no documentation of their occurrence within the project area except infrequently, during migrations.

Alternative B (Proposed Action)

Available data indicates there are 12 raptor nests within 0.5 mile (2,640 feet) of the proposed right-of-way for Alternative B in South Dakota and 71 nests within that distance in Wyoming. Most of the potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are in riparian corridors. Nearly 85.0 miles of Alternative B would pass within 0.5 mile of potential nesting habitat in riparian zones in both states. Alternative B would also result in the loss of 130.9 acres of woodland.

Raptors nesting within 0.25 mile (1,320 feet) of the right-of-way are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 5 red-tailed hawk nests within 0.25 mile of Alternative B. In Wyoming, there are 7 red-tailed hawk nests, 5 golden eagle nests, 1 great horned owl nest, and 17 ferruginous hawk nests within that distance. Of those species, ferruginous hawks are most likely to abandon nests if disturbed during the nesting period since they are more sensitive to disturbance than other species. However, many ferruginous hawk nests and nests of other species that are within 0.25 mile of the proposed route have not been active recently. Nests closest to the proposed right-of-way could be most at-risk if individuals in the temporary work force were involved in illegal shooting, an additional potential short-term impact to raptors.

Alternative C (Modified Proposed Action)

Available data indicates there are 12 raptor nests within 0.5 mile of the proposed right-of-way for Alternative C in South Dakota and 67 nests within that distance of Alternative C in Wyoming. Most of the potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are along the riparian corridors associated with the Cheyenne River and tributaries. Approximately 58.5 miles of Alternative C would pass within 0.5 mile of potential wintering habitats in those riparian zones in both states compared to 85.0 miles similarly affected by Alternative B. Alternative C would result in the loss of 48.4 acres of woodland.

Raptors nesting within 0.25 mile of the right-of-way are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 6 red-tailed hawk nests, 2 golden eagle nests, and 1 great horned owl nest all within 0.25 mile of Alternative C. But in Wyoming, there are 7 red-tailed hawk nests, 6 golden eagle nests, 2 great horned owl nests, 1 Swainson's hawk nest and 22 ferruginous hawk nests within that distance.

Alternative D (Existing Corridors Alternative)

Available data indicates there are 8 nests within 0.5 mile of the proposed right-of-way for Alternative D in South Dakota and 69 nests within that distance of Alternative D in Wyoming. There are probably more than these within 0.5 mile but much of Alternative D in both states was not surveyed for raptors. Most of the potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are in riparian corridors associated with the Cheyenne River and tributaries. Only 29.9 miles of Alternative D would pass within 0.5 mile of potential nesting habitats in those riparian zones in both states compared to 85.0 miles for Alternative B and 58.5 miles for Alternative C.

Raptors nesting within 0.25 mile of the right-of-way are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 3 red-tailed hawk nests within 0.25 mile of Alternative D. In Wyoming, there are 6 red-tailed hawk nests, 3 golden eagle nests, 2 great horned owl nests, 1 Swainson's hawk nest and 25 ferruginous hawk nests within that distance. Since raptor nesting data for Alternative D is incomplete, there are probably more nest sites within 0.25 mile of the existing tracks in South Dakota and Wyoming. However, birds nesting within that distances of existing railroads are probably somewhat habituated to train traffic and noise, especially in Wyoming where Alternative D would follow an existing high traffic volume route.

4.4.10.3 Aquatic and Fisheries

There are no trout fisheries within the proposed project area. Warm water game fish species (largemouth bass, catfish, sunfish) as well as those preferring cooler water (walleye, pike) are present mostly in South Dakota due to their being more perennial streams and rivers. Many of these species are tolerant of the relatively high turbidity that periodically occurs in these streams and the Cheyenne River and also are tolerant of low flows in the river and perennial streams during drought years. Because of frequent limited flows below Angostura Reservoir, channel catfish are the principal recreational fishery in the Cheyenne River below the Angostura Dam (USFWS, 1993a). Short-term increases in TSS and turbidity, similar to those that could be expected during construction of this project, would likely have little affect on existing fisheries. However, increased sedimentation could lead to reduction in spawning habitat, resulting in reduced reproduction and populations of fish species present. Spills of hazardous materials during construction could reduce water quality and contribute to loss of fish and other aquatic life. Such impacts would be unlikely unless they occur in a perennial stream during a low or no-flow period thereby potentially having a local impact. As large amounts of hazardous materials are not expected to be present at construction sites and any flow would quickly dilute the small quantities released, no impacts are anticipated from spills.

Degradation to water quality by erosion and/or discharge of hazardous materials would be a significant impact to the Angostura Reservoir fishery. Additionally, significant increases in sedimentation of the Reservoir due to increased erosion during project construction could reduce fish habitat. These impacts are not anticipated due to the minimal construction along the Cheyenne River (only a few miles) upstream of the Reservoir and the distance (over 10 miles) the construction would occur from the Reservoir.

During rail line operation, impacts to fisheries and other aquatic resources would primarily result from a release of hazardous materials into a stream or river or a spill of coal. These impacts would most likely result in the unlikely event of a derailment at or adjacent to a perennial drainage. Fuel or other petroleum products could be spilled, but would likely only impact the immediate area of the spill due to limited amounts being present. While coal is not considered hazardous, in the event loaded rail cars spill into a perennial drainage, an increase in TSS could occur. This increase would only be temporary, as most of the coal would be of the size to settle to the bottom and not be carried off by stream flow.

Alternative B (Proposed Action)

There are 177 total sites where Alternative B is within 500 feet of the Cheyenne River and perennial tributary streams in South Dakota and Wyoming. Alternative B would pass within 500 feet of these drainages for a total of 21.9 miles. Alternative B would cross 20 perennial and 623 intermittent streams. These sites are believed to be those most likely for sediments and/or accidentally released toxic compounds to be discharged into the Cheyenne River system, both in the short- and long-term.

Alternative C (Modified Proposed Action)

There are 206 total sites (29 more than Alternative B) where Alternative C is within 500 feet of the Cheyenne River and perennial tributary streams in South Dakota and Wyoming. Alternative C would pass within 500 feet of these drainages for a total of 20.8 miles. Alternative C would have 14 perennial and 520 intermittent stream crossing. These sites are believed to be those most likely for sediments and/or accidentally released toxic compounds to be discharged into the Cheyenne River system, both in the short- and long-term.

Alternative D (Existing Corridors Alternative)

There are 76 total sites (101 fewer than Alternative B and 130 fewer than Alternative C) where Alternative D is within 500 feet of the Cheyenne River and perennial tributary streams in South Dakota and Wyoming. Alternative D would pass within 500 feet of these drainages for a total of 13.5 miles, less than the other alternatives. Alternative D would cross 68 perennial and 707 intermittent streams. These sites are believed to be those most likely for sediments and/or accidentally released toxic compounds to be discharged into the Cheyenne River system, both in the short-term and long-term.

4.4.10.4 Sensitive, Threatened, and Endangered Species

Potential impacts to Federally listed endangered or threatened species, species proposed for listing, candidate species, and species with special status recognized by the USFWS could include:

- The death of individuals of the species.
- Reduced recruitment and/or survival of individuals, slowing the species' recovery or expansion of current populations.
- Loss of Federally designated critical habitats.
- Loss of known habitat.
- Contributing to other causes of species decline resulting in an unlisted species, particularly a candidate or species of concern, warranting consideration for or being proposed for listing as Federally threatened or endangered.

Impacts on Federally listed species were considered and evaluated if the species potentially occurs in the vicinity of any proposed alternative. The species would be considered potentially impacted by the project if any alternative could result in:

- Direct mortality of individuals.
- Long-term or permanent loss or alteration of existing or potential habitat necessary for the life history functions (breeding, wintering, or migration) of one or more threatened or endangered species.

4.4.10.4.1 Black-Footed Ferret

Because there is no recent documented evidence that ferrets presently occur within the proposed project area it is unlikely that any of the Extension Alternatives would impact existing populations of ferrets. However, Alternative B would cross 4.9 miles of prairie dog colonies, north of a proposed black-footed ferret reintroduction site at the Rosecrans Reintroduction Area on TBNG. The presence of an operating rail line and the potential danger of mortality to any introduced ferrets could make this site unsuitable for reintroduction of the species. As suitable reintroduction sites for ferrets are becoming less available due to development, construction, and operation of Alternative B across this area could jeopardize recovery efforts to establish a sufficient number of wild ferret populations to allow the species to maintain itself.

4.4.10.4.2 Piping Plover

Construction impacts would include noise disturbance and increased human activity that could affect nesting piping plovers. Increased stream turbidity and sedimentation and spills of petroleum products such as diesel fuels or lube oils during construction of the proposed project could affect aquatic invertebrates which piping plovers rely on for their food source. Construction along the Cheyenne River during spring and early summer could displace piping plovers if they select sandbars or islands within the river to nest. During operation, noise from trains disturbing nesting piping plovers would be the most likely impact. Should spills of hazardous materials occur, they could also affect piping plovers, similar to those affects possible from a spill during construction.

The possibility of an increase in predators may lead to a relatively high risk of nest predation for nests in the vicinity of the rail line compared to those further removed (Reeve 1990, Hein & Andelt 1996). Additionally, long-term impacts to piping plovers may include noise and nest disturbance from increased human activity.

The distance that the right-of-way for the Extension Alternatives would be within 0.5 mile and 1.0 mile and the number of locations and total distance where Alternative B would be within 500 feet of the Cheyenne River and its perennial tributaries in South Dakota and Wyoming provide some indication of the level of impact construction could have to piping plovers.

Alternative B (Proposed Action)

Approximately 112.0 miles of Alternative B would be within 1.0 mile of a perennial stream, 74.0 miles would be within 0.5 mile, and 19.1 miles would be within 500 feet of a perennial stream. Alternative B would cross 20 perennial and 623 intermittent streams and convert over 62.1 acres of wetland to rail line right-of-way.

Alternative C (Modified Proposed Action)

Approximately 81.0 miles of Alternative C would be within 1.0 mile of a perennial stream or river, 50.0 miles would be within 0.5 mile, and 24.3 miles would be within 500 feet of these. Alternative C would have 14 perennial and 520 intermittent stream crossing and convert 62.2 acres of wetland to rail line right-of-way.

Alternative D (Existing Corridors Alternative)

Approximately 46.0 miles of Alternative D would be within 1.0 mile of a perennial stream or river, 30.0 miles would be within 0.5 mile, and 13.5 miles would be within 500 feet of these. Alternative D would cross 68 perennial and 707 intermittent streams and convert 40.7 acres of wetland to rail line right-of-way.

4.4.10.4.3 Interior Least Tern

Because Interior least terns utilize similar habitat and have similar life histories to piping plovers (Section 4.1.10), the potential impacts to terns from the Extension Alternatives would be similar to those described in Section 4.4.12.2 for piping plovers. The exception would be that terns appear somewhat tolerant of distant noises, such as highway traffic, and may not be disturbed from nesting in suitable habitat by either construction or operation of the alternatives.

4.4.10.4.4 Pallid Sturgeon

Suitable habitat does not exist in the vicinity of any of the Extension Alternatives. Therefore, this species would not be affected by their construction and operation.

4.4.10.4.5 American Burying Beetle

American burying beetle habitat may be disturbed or lost during construction and operation of the rail line. Most likely are impacts due to construction, such as removal and compaction of soils, but only if beetles are present within construction right-of-way. Once the ballast is laid and the earth compacted in the right-of-way it is unlikely these areas would be suitable habitat for the beetle. Impacts due to artificial lights, which are known to attract and disorient many species of nocturnal insects, could occur due to lighting during nightime and evening construction and from security lighting.

Alternative B (Proposed Action)

Though not documented in the vicinity of Alternative B in South Dakota, American burying beetles could occur in suitable soils. There are approximately 32.4 miles (approximately 1,570.9 acres) in South Dakota where Alternative B would pass through soils and habitats that might be used by American burying beetles.

Alternative C (Modified Proposed Action)

Impacts would be similar to those for Alternative B. There are approximately 34.3 miles, (approximately 1,663.0 acres) in South Dakota where Alternative C would pass through suitable soils in potential habitats that might be used by American burying beetles. However, nearly 22.1 miles of Alternative C passes through soils with characteristics to be prime farmlands. If these lands are irrigated and/or cultivated, they would not be suitable habitat for the beetle.

Alternative D (Existing Transportation Corridors)

Construction of this alternative would have similar impacts as Alternatives B and C. However, this alternative passes through more miles of potential habitat. There are approximately 39.4 miles (approximately 955.1 acres) in South Dakota where Alternative D would pass through suitable soils in potential habitats that might be used by American burying beetles. Approximately 38.6 miles of Alternative D passes through soils with characteristics to be prime farmlands, but whether all or some are irrigated and/or cultivated is unknown.

4.4.10.4.6 Ute Ladies'-tresses Orchid

Loss of existing populations or portions of populations of Ute Ladies'-tresses orchid and loss of suitable habitat during construction would be the primarily impacts of construction and operation of the proposed alternatives. Spills of hazardous materials during construction and operation and herbicide application to control vegetation during operation could damage or destroy populations of this orchid outside the right-of-way.

Alternative B (Proposed Action)

As a result of a survey conducted by SEA, two sites along Alternative B have been identified as potential habitat for Ute ladies'-tresses, one site in South Dakota (Dry Creek) and one site in Wyoming (Lodgepole Creek). Alternative B would cross a total of 33.2 acres of wet meadows and palustrine emergent wetland temporarily and seasonally flooded, considered to be suitable habitat for this orchid.

Alternative C (Modified Proposed Action)

There are three sites along Alternative C that SEA identified as potential habitat for Ute ladies'-tresses, one site in South Dakota (Dry Creek) and two sites in Wyoming (Lodgepole Creek and School Creek). In South Dakota, Alternative C would cross a total 39.2 acres of wet meadows and palustrine emergent wetland temporarily and seasonally flooded habitat.

Alternative D (Existing Transportation Corridors)

There is one site along Alternative D that SEA identified as potential habitat for Ute ladies'-tresses. The site is at the crossing of Dry Creek in South Dakota where Alternative D and Alternative C follow the same alignment. In South Dakota, Alternative D would cross a total of 26.4 acres of wet meadows and palustrine emergent wetlands that are temporarily and seasonally flooded, that could be potential habitat for the orchid.

4.4.10.4.7 Bald Eagle

Construction of Extension Alternatives during winter within the TBNG and along the corridor of the Cheyenne River in South Dakota and its major tributaries in Wyoming is likely to displace wintering bald eagles from perches and feeding areas or make those sites temporarily unsuitable. Noise from blasting and the operation of heavy earthmoving equipment and other activities associated with construction and preparation of the rail bed could potentially disturb bald eagles. However, construction activities during the winter would be limited to placement of culverts and bridges throughout the project area. Bald eagles would only be disturbed by these activities if they occurred in the vicinity of roosting, perching, or feeding areas during periods when eagles were present. Because bridge and culvert construction at any location would be short-term, taking only a few days, eagles disturbed at a location could return within a short time due to construction activities relocating. Any disturbance would be most significant during severe weather as it would unnecessarily stress individuals, potentially leading to their loss. These periods would likely be inappropriate for construction and work would cease. Therefore, during these critical times, it would be unlikely construction activities would occur and disturb wintering eagles. Should weather conditions allow the construction season to extend into the fall and winter months or begin earlier than normally expected in the spring, wintering eagles could be disturbed by rail line construction. However, if the weather is suitable for such construction, eagles may not be present, having lingered in more northern areas or returned to them early due to good weather. Any eagles that would remain would likely have abundant areas for use as other eagles that may have been competitors for food and roosting space would not be present. Some trees suitable as bald eagle winter roost sites or future nesting sites could be removed during rail line construction, resulting in these areas no longer being available for eagle use.

Once the rail line is operational, disturbances to wintering bald eagles could occur because of train noise and increased human activity. Since wintering bald eagles in some areas feed on big game carrion, they sometimes suffer direct mortalities when struck by vehicles while feeding at roadsides. Similar impacts could result from eagles being hit by trains if they are feeding on carrion along the rail line. Such mortality would be most likely to young birds unskilled at finding food and during severe weather when big game may be more susceptible to being hit by trains and other eagle food sources would be scarce.

Alternative B (Proposed Action)

Approximately 78.5 miles and 118.0 miles of Alternative B would be within 0.5 and 1.0 miles, respectively, of potential bald eagle wintering habitat. Alternative B would result in the loss of 130.9 acres of woodland habitat, potentially providing roosting and nesting areas.

Alternative C (Modified Proposed Action)

Approximately 57.4 miles of Alternative C passes within 0.5-mile of potential bald eagle winter habitats in South Dakota and Wyoming. Almost 89.8 miles of Alternative C would be within 1.0 mile of potential bald eagles wintering habitats. Alternative C would result in the loss of approximately 193.8 acres of woodland habitat.

Alternative D (Existing Transportation Corridors)

Nearly 29.9 miles of Alternative D passes within 0.5-mile of potential bald eagle winter habitats in South Dakota and in Wyoming. If construction and operation related disturbances affected wintering bald eagles up to 1.0 mile away, almost 45.1 miles of Alternative D would be within that distance from potential habitats. Specifically in South Dakota, Alternative D would affect less potential habitats along the Cheyenne River than Alternative B or C. Alternative D would result in the loss of approximately 237.5 acres of woodlands potentially used by eagles.

4.4.10.4.8 Mountain Plover

Since mountain plovers nest on the ground, adult birds, eggs and young may be susceptible to mortality by vehicles and construction equipment, especially along 2-track range roads and undeveloped areas during construction. Noise disturbance and human activity during construction could also displace mountain plovers from nesting near construction sites. Grassland habitat, particularly areas with prairie dog towns, provide nesting habitat for mountain plovers and construction through these areas would result in the conversion of potential nesting habitat to rail line right-of-way.

During operation, mountain plovers may avoid areas within and adjacent to the rail line right-of-way due to noise disturbance. However, if DM&E maintains a fire break along the rail line and within the right-of-way, the open ground may appear similar to prairie dog colonies and attract mountain plover to nest. The adults, eggs, and chicks could be susceptible to mortality during rail line maintenance activities should these occur during the nesting season. Some mortality to chicks may occur if they wander onto the rail line.

Alternative B (Proposed Action)

Alternative B would pass through approximately 92.4 miles of grasslands (approximately 4,480 acres) in South Dakota and approximately 128.0 miles (approximately 6,206.1 acres) in Wyoming that SEA considers potential nesting habitat that would be converted to railroad right-of-way. Additionally, there are 3.4 miles (approximately 164.5 acres) of prairie dog colonies in South Dakota and 8.1 miles (392.7 acres) that are considered potential nesting habitat that would be converted to railroad right-of-way.

Alternative C (Modified Proposed Action)

There are 106.7 miles of grasslands (approximately 5,173.3 acres) in South Dakota and 110.3 miles (approximately 5,347.9 acres) in Wyoming that SEA considers potential nesting habitat that would be converted to railroad right-of-way. Additionally there is 5.1 miles (approximately 247.3 acres) of prairie dog colonies in South Dakota and 12.4 miles (approximately 601.2) in Wyoming that are considered potential nesting habitat that would be converted to railroad right-of-way.

Alternative D (Existing Transportation Corridors)

Alternative D would pass through 119.2 miles (approximately 2,889.6 acres) of grasslands in South Dakota and 110.3 miles (approximately 5.347.9 acres) in Wyoming that are considered potential nesting habitat that would be converted to railroad right-of-way. Additionally, there are 2.9 miles (approximately 24.3 acres) of prairie dog colonies in South Dakota and 3.3 miles (approximately 80.0 acres) that are considered potential nesting habitat that would be converted to railroad right-of-way.

4.4.10.4.9 Swift Fox

Swift fox are probably found using all upland habitats in the vicinity of the proposed project in South Dakota and Wyoming. However, they are more at risk where the proposed project would cross prairie dog colonies. Additional habitat outside the right-of-way may be unsuitable due to human activity and noise during construction. Removal of vegetation from the project area may reduce prey species and potential swift fox habitat. This species is occasionally killed by vehicular traffic, which has been estimated as contributing 5 percent of annual swift fox mortality. Therefore, increased construction vehicle traffic could increase mortality. Swift foxes do consume carrion (Samuel and Nelson 1982, Uresk and Sharps 1986, Scott-Brown et al. 1987) and so are vulnerable to being struck by trains if they feed on carcasses along the rail line once it is operational.

Alternative B (Proposed Action)

There are 11.5 miles (approximately 557.5 acres) of prairie dog colonies in South Dakota and Wyoming that would be converted to railroad right-of-way for construction of Alternative B.

Alternative C (Modified Proposed Action)

Alternative C would result in 17.5 miles (approximately 848.5 acres) of prairie dog colonies in South Dakota and Wyoming that would be converted to railroad right-of-way.

Alternative D (Existing Transportation Corridors)

There are 6.2 miles (approximately 150.3 acres) of prairie dog colonies in South Dakota and Wyoming that would be converted to railroad right-of-way during construction of Alternative C.

4.4.10.4.10 Sturgeon Chub

Sturgeon chub appear susceptible to increased sedimentation that could occur as a result of construction of the proposed project. Further, changes in stream flow due to bank stabilization could alter, degrade, or eliminate downstream habitats. These impacts are unlikely due to the few and scattered crossings of the Cheyenne River by the Extension Alternatives. Accidental releases of petroleum products into the Cheyenne River during construction or operation could reduce or eliminate populations of sturgeon chub. Again, these impacts are unlikely due to the limited quantities of such materials available to be spilled and the flow in the Cheyenne River able to quickly dilute these small amounts to unharmful concentrations.

Alternative B (Proposed Action)

There are 177 total sites where Alternative B is within 500 feet of the Cheyenne River and perennial tributary streams. Alternative B would pass within 500 feet of these drainages for a total of 19.1 miles. Alternative B would cross 20 perennial streams and 623 intermittant stream. In South Dakota, it would cross 14 perennial streams, including 3 crossings of the Cheyenne River and 208 intermittent streams. In Wyoming, this alternative would cross 6 perennial streams and 415 intermittent streams.

Alternative C (Modified Proposed Action)

There are 206 sites on the Cheyenne River and perennial tributary streams, combined, where Alternative C is within 500 feet of the drainages. Approximately 20.8 miles of Alternative C is within 500 feet of the Cheyenne River and tributaries. Alternative C would cross 14 perennial streams and 520 intermittent streams. In South Dakota, this alternative would cross 10 perennial streams, including 3 crossings of the Cheyenne River and 230 intermittent streams. In Wyoming, this alternative would cross 4 perennial streams and 290 intermittent streams.

Alternative D (Existing Transportation Corridors)

There are 76 sites on the Cheyenne River and perennial tributary streams, combined, where Alternative D is within 500 feet of the drainages. Less than 13.5 miles of Alternative D is within 500 feet of the Cheyenne River and tributaries. Alternative D would cross 68 perennial and 707 intermittent streams. In South Dakota, Alternative D would cross 45 perennial streams and 312 intermittent streams. Alternative D would cross the Cheyenne River twice in South Dakota. In Wyoming, this alternative would cross 23 perennial streams and 395 intermittent streams.

4.4.10.4.11 Black-tailed Prairie Dog

Locations of prairie dog colonies along each alternative were obtained from a variety of sources. These included colonies mapped by WGFD during the late 1980's which are not current. Because accurate, current mapping is not available and colonies are abandoned, die off, and start new continually, it is difficult to determine the exact amount of prairie dog habitat crossed by the Extension Alternatives.

Direct impacts to black-tailed prairie dogs are most likely to occur during the construction phase of the project if the animals occur in the right-of-way. Destruction of burrows and loss of individuals would likely occur from earthmoving activities. Colony habitat within the right-of-way would be lost, although prairie dogs may recolonize portions of the right-of-way. Long-term impacts include fragmentation of the black-tailed prairie dogs' habitat, increased mortality from passing trains due to prairie dogs moving around the colony and across the rail line and potentially disease occurrence due to disease being spread between colonies along the rail line.

Alternative B (Proposed Action)

At least 11.4 miles (approximately 552.7 acres) of alternative B would pass through prairie dog colonies in South Dakota and Wyoming.

Alternative C (Modified Proposed Action)

At least 16.9 miles (approximately 819.4 acres) of Alternative C would pass through prairie dog colonies in South Dakota and Wyoming.

Alternative D (Existing Transportation Corridors)

At least 6.2 miles (approximately 150.3 acres) of Alternative D would pass through prairie dog colonies in South Dakota and Wyoming.

4.4.11 TRANSPORTATION

All of the Extension Alternatives would likely impact transportation throughout the project area. Impacts would include:

- Increased vehicle traffic volume on area highways and roads.
- Accelerated deterioration of public road surfaces due to increased vehicle traffic.
- Increased road maintenance requirements due to roadway deterioration.

- Increased speeding from motorist trying to beat trains to grade crossings.
- Conflicts between rail carriers for access to the coal mines.
- Increased rail competition, potentially resulting in lower coal transportation costs.
- More efficient movement of PRB coal due to shorter routes being provided.

Sections 4.1.9 and 4.2.9 describe the transportation facilities in the project area. Construction activities would have temporary, short-term impacts on existing transportation systems, including Federal, state, county, and private roads. Rural roadways and bridges incapable of supporting construction traffic would require upgrading for safe transportation. Road crossings, both grade and grade separated, may require road closure and associated detours during construction of the crossings. Additionally, routes for emergency vehicle response would have to be redesigned to avoid closed crossing and still maintain timely response. Pedestrian traffic in communities would also need to be modified to avoid crossing closures and construction areas, potentially resulting in pedestrians walking significant distances out of their way or crossing the rail line at unauthorized locations. These temporary impacts would be limited to the two to three year construction period and would likely be limited to only the period when construction was occurring in a particular area. Once it was completed and shifted to other areas, other roadways would likely be used to access construction sites. These impacts would include increased traffic and congestion on roadways due to the transportation of materials and crews to work sites. Transportation of materials in heavy trucks and movement of construction equipment could accelerate wear and tear on local roadways not designed to handle the level of traffic or weight of construction vehicles. Rural roadways and bridges incapable of supporting construction traffic would require upgrading for safe transportation. Delays or detours may be required during construction of grade crossings, resulting in inconvenience to motorists.

Construction activities could impact rail traffic, both on the existing DM&E system and the systems of other rail carriers. However, DM&E has indicated that rail line reconstruction, such as that necessary for the existing rail line portion of Alternative D, would occur in such a manner as to maintain rail service along the rail line. Some delays to trains may occur but no significant impacts are anticipated. Additionally, construction of the DM&E rail line could impact rail operations of other rail carrier due to both delays in DM&E traffic to be interchanged and construction of rail/rail crossings or in proximity to other rail lines. Should DM&E experience train delays due to construction, interchanging rail carriers could also experience delays due to crews waiting for trains and rail schedules being impacted. While some impacts would likely occur, they should not significantly impact the overall operations, local, regional, or nationwide, of interchanging rail carriers. During construction of new crossings of other rail carriers or construction in close proximity to their rail lines, trains using these crossing or section of rail line may be delayed or need to be rerouted to avoid the areas. Coordination between the railroads would be imperative to maintain safe rail operations and allow construction activities to occur in a manner least disruptive to either railroad. Again, some impacts are expected, although they are not expected to be significant.

During operation, new grade crossings would result in motorist delays due to trains periodically blocking grade crossings. To analyze the effects of the increased traffic on delays at existing highway/rail crossings, SEA identified roadway grade crossing for which the average daily traffic (ADT) would exceed 5,000 vehicles. SEA then calculated potential vehicle delay at these crossings. In order to analyze the effects of the proposed construction on the roadway system at new public highway/railroad at-grade crossing locations, SEA analyzed the crossings for all three proposed levels of operation; 20 MNT, 50 MNT and 100 MNT for train lengths of both 6,400 feet (115 rail cars plus locomotives) and 7,400 feet (135 rail cars plus locomotives). SEA concluded that the potential effect of train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and the vehicular delay (estimated to be minutes for trains traveling 45 mph) and number of vehicles delayed per train passing event would be minimal. Only Alternative D would have grade crossings with ADTs of 5,000 vehicles per day or greater, all of which would be in Pennington County, South Dakota. SEA categorized crossing based on the level of service. Levels of service ranged from free-flowing to severely congested and were quantified as follows:

Table 4.4-40
Grade Crossing Levels of Service

Level of Service	Average Total Delay (sec/vehicle)
A	≤5
B	>5 and ≤10
C	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤ 45
F	>45

As part of the transportation analysis, SEA determined the time each crossing would be blocked per train crossing event. This time included the time for the train to pass along with time for warning structures to be deployed and restored after the train passed. Because train passing time is dependent on train speed and trains would generally be operating at speeds ranging from 45 to 49 miles per hour, SEA conservatively used 45 miles per hour for all calculations concerning vehicle delay. Blocked crossing time per train was calculated to be 2.1 minutes for 115-car trains and 2.4 minutes for 135-car trains. SEA determined significant impact to traffic from the project would result from an average 30-second increase in vehicle delay or level of service rated E or F (regardless of the existing condition). Additionally, a reduction of existing level of service of C or better to a level of D or worse due to the project would result in a significant impact. The detailed description of levels of service and criteria of significance are included in Appendix G , "Traffic and Transportation." The results of SEA's delay calculations are provided below.

Because much of the area has wide viewsheds, motorists would likely see trains approaching grade crossing and may increase their vehicle speed to try and beat the train to the crossing in order to avoid being delayed. Operation of a new rail providing access to the PRB mines would also provide the opportunity for operational conflicts between the different railroads. These conflicts would primarily be related to access to the mines, where a train from one railroad would be required to wait for another railroad's train to finish loading and exit the mine rail loading loop before it could enter and be loaded. However, an additional rail carrier, operating over a largely different route, would provide competition between rail carriers for transport of PRB coal. Such competition would likely cause a reduction in rail transportation rates and require rail carriers to become more efficient in order to be more competitive. Transportation of PRB coal could also become more efficient due to shorter routes for its transport being available.

Alternative B (Proposed Action)

Alternative B would have 44 new grade crossings of public roads, 30 in South Dakota and14 in Wyoming. None of these crossings would have ADT's greater than 5,000. Therefore, SEA did not calculate vehicle delay for these crossings.

Alternative C (Modified Proposed Action)

Alternative C would have 45 new grade crossings of public roads, 29 in South Dakota and 16 in Wyoming. None of these crossings would have ADT's greater than 5,000. Therefore, SEA did not calculate vehicle delay for these crossings.

Alternative D (Existing Transportation Corridors)

Alternative D would have 10 new grade crossings of public roads, all in South Dakota, and affect 98 existing public grade crossings along the portion of this alternative that uses the existing DM&E rail line (56 crossings) and parallels the existing BNSF rail line (42 crossings). Three of these crossings would have ADT's greater than 5,000. SEA calculated potential values of vehicle delay at those crossings where average daily traffic (ADT) volumes are 5,000 or greater. The description of levels of service and criteria of significance has been addressed in Appendix C, "Traffic and Transportation."

Pennington County

20 MNT

There are three public grade crossings in Pennington County with ADT's above 5,000 for which SEA conducted vehicle delay calculations. The three crossings include the East Boulevard crossing (Mile post 99.9), the Maple Avenue crossing (Mile post 99.5), and E. Saint Patrick Street (Mile post 98.3). All three crossing are on the existing DM&E rail line and would experience a reduction in delay per stopped vehicle due to increased train speeds. The level of service under this alternative would be A for both train length scenarios. The crossing would also experience a reduction in maximum vehicle queue length.

50 MNT

All three crossings would experience a reduction in delay per stopped vehicle. The level of service under this alternative would be A for the 6,400-foot train scenario and B for the 7,400-foot train scenario. The crossings would also experience a reduction in maximum vehicle queue length.

100 MNT

All three crossings would experience a reduction in delay per stopped vehicle. The level of service under this alternative would be B for both train length scenarios. The crossings would also experience a reduction in maximum vehicle queue length.

Emergency Vehicle Response

Construction and operation of any of the Extension Alternatives would likely require police, fire, and emergency medical services (EMS), or ambulance, to periodically cross the rail line when responding to an emergency. These crossings would be expected to occur most often on public roads. However, due to the rural nature of the area and limited access to many areas, emergency vehicles may also cross the rail line at private crossing, particularly to access a fire. In some instances, the rail line right-of-way may provide a suitable travel route that would also be the shortest and most direct access to an emergency, providing better access than established roadways.

Although the rail right-of-way could provide access for emergency vehicles to rural emergencies, it would also provide an opportunity for emergency to be delayed by a passing train when required to cross the rail line. As discussed in Section 4.3.12, the further a emergency is from emergency services, the more significant the emergency can become. In the case of a fire, increased distance increases response time, potentially leading to greater damage. In a medical emergency, particularly one that is life-threatening, increased response time increased distance from a hospital increases the need for timely EMS treatment. In both cases, added time from delays at grade crossings could prove significant, particular in this rural area with limited access. However, few roads, with little traffic would be crossed by the Extension Alternatives. This combined with the low population of the area reduce the frequency at which emergencies would be expected to occur. Because train passing events and emergencies are random events that are independent of each other, as discussed in Section 4.3.12, it is not possible to predict the potential for an emergency vehicle, responding to a life-threatening emergency, to be blocked by a passing train. While it is possible for such an incident to occur with potentially significant adverse impacts, such as property damage from a fire or loss of life, such incidents are anticipated by SEA to be unlikely.

Because much of the area has wide viewsheds, motorists would likely see trains approaching grade crossing and may increase their vehicle speed to try and beat the train to the crossing in order to avoid being delayed. Operation of a new rail providing access to the PRB mines would provide the opportunity for operational conflicts between the different railroads. These conflicts would primarily be related to access to the mines, where a train from one railroad would be required to wait for another railroad's train to finish loading and exit the mine rail loading loop before it could enter and be loaded. However, an additional rail carrier, operating over a largely different route, would provide competition between rail carriers for transport of PRB coal. Such competition would likely cause a reduction in rail transportation rates and rail carriers to become more efficient in order to be more competitive. Transportation of PRB coal could also become more efficient due to shorter routes for its transport being available.

4.4.12 SAFETY

The proposed project has the potential to impact vehicle safety at grade crossings, pedestrian safety at designated crossings, along the rail line, and train safety. These impacts could occur during both construction and operation of the project.

During construction at grade crossings, delays and detours for vehicles could occur. Motorists using these crossings could become frustrated with these conditions and try to cross during construction, beat trains to avoid delay at other grade crossings, or increase speeds along detour routes. These actions, combined with increased traffic congestion along detour routes could result in unsafe conditions for motorists and pedestrians, potentially leading to increased vehicle/vehicle and vehicle/pedestrian accidents.

Pedestrians in communities through which the alternatives (particularly Alternative D) pass may also become frustrated with increased inconvenience from walking further distances and cross the rail line at closed crossings, walk along the rail line right-of-way, or cross at unauthorized locations. These actions could result in injury to pedestrians from construction related activities. Additionally, the presence of construction equipment and materials would likely be attractive to children and adolescents who could be injured playing around construction sites.

During construction, rail safety would be a continual concern. Construction activities could damage the track or incomplete construction could lead to derailments. Prior to operation of trains following construction activities, rail bed and track should be inspected for defects to help reduce the likelihood of derailments. Construction workers within the right-of-way could be injured by passing trains or flying debris, particularly in areas near other carriers' rail lines. Appropriate coordination between construction and trains crews would be important to maintain a safe working environment.

Train activity during operation could affect the safety of roadway users at highway/rail grade crossings. To address potential changes in accident frequency, SEA determined accident frequency rates at all public highway/rail grade crossings that would be affected by the Extension Alternatives. At existing grade crossings (such as those along Alternative D), SEA looked at the most recent five years of accident history available and calculated the potential change in the number of years between accidents. SEA's analysis procedure considered the type of existing warning devices at the highway/rail grade crossings, including passive devices (signs or crossbucks), flashing lights, or gates.

To evaluate the significance of potential changes in accident frequency along affected grade crossings in South Dakota and Wyoming, SEA categorized highway/rail grade crossings into two categories:

<u>Category A</u>

Category A consists of highway/rail grade crossings with relatively frequent train vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates at or above the state's 50th highest accident frequency rate of one accident every 20 years (0.051 accident frequency rate) to be Category A highway/rail grade crossings. SEA considered highway/railroad grade crossings in Wyoming with accident frequency rates at or above the states 50th highest accident frequency rate of one accident every 40 years (0.025

accident frequency rate) to be Category A highway/rail grade crossings. For all Category A highway/rail grade crossings, SEA considered the relatively small accident frequency rate increase of one accident every 100 years (a 0.01 accident frequency rate increase) to be significant.

Category B

Category B consisted of highway/rail grade crossings with relatively few train vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates less than one accident every 20 years (less than 0.051 accident frequency rate) to be Category B highway/rail grade crossings. SEA considered highway/rail grade crossings in Wyoming with accident frequency rates lass than one accident every 40 years (less than 0.025 accident frequency rate) to be Category B highway/railroad grade crossings. For these crossings, SEA considered an accident frequency rate increase of one accident every 20 years (a 0.05 accident frequency rate increase) to be significant.

Increased train activity could potentially affect the safety of roadway users at locations where the rail line crosses the roadway. SEA evaluated the accident potential along each of the Extension Alternatives in South Dakota and Wyoming at locations where the railroad tracks cross public roadways grade. SEA did not analyze grade-separated crossings because these crossings eliminate the potential for train vehicle accidents by physically separating the roadway from the railroad track. Appendix H includes the results of SEA's analysis. A summary of SEA's county by county analysis is presented below.

Alternative B (Proposed Action)

The county analysis includes all crossings along the proposed Alternative B alignment except those along the proposed Spring Creek Segment, Phiney Flat Alternative, Hay Canyon Segment, WG Divide Alternative and Oral Segments. The crossings along these Alternative B segments are analyzed separately under the preceeding headings of this Section.

Pennington County

20 MNT

SEA's safety analysis showed that for the 6 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.022. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 45 years, respectively. The proposed crossings in Pennington County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 90 years to one accident every 35 years, respectively. The proposed crossings in Pennington County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.035. This translates into a range of estimated annual accident frequency from one accident every 68 years to one accident every 28 years, respectively. The proposed crossings in Pennington County are all classified as Category B.

Custer County

20 MNT

SEA's safety analysis showed that for the 2 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 122 years to one accident every 34 years, respectively. SEA found these predicted rates to be below the criteria for significance. The proposed crossings in Custer County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.039. This translates into a range of estimated annual accident frequency from one accident every 88 years to one accident every 26 years, respectively. The proposed crossings in Custer County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.048. This translates into a range of estimated annual accident frequency from one accident every 66 years to one accident every 21 years, respectively. The proposed crossings in Custer County are all classified as Category B.

Fall River County

20 MNT

SEA's safety analysis showed that for the 22 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.031. This translates into a range of estimated annual accident frequency from one accident every 122 years to one accident every 32 years, respectively. The proposed crossings in Fall River County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.041. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 25 years, respectively. The proposed crossings in Fall River County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.050. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident every 20 years, respectively. The proposed crossing at Old U. S. Highway 18, MP 716.50 is classified as Category A. All other proposed crosings in Fall River County are classified as Category B.

Niobrara County

20 MNT

SEA's safety analysis showed that for the 3 public highway/railroad grade crossings required for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.023. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 43 years, respectively. The proposed crossings in Niobrara County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.030. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 33 years, respectively. The proposed crossing at US Highway 85, MP 741.20 is classified as Category A. All other proposed crossings in Niobrara County are classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.037. This translates into a range of estimated annual accident frequency from one accident every 66 years to one accident every 27 years, respectively. The proposed crossing at US Highway 85, MP 741.20 is classified as Category A. All other proposed crosings in Niobrara County are classified as Category B.

Weston County

20 MNT

SEA's safety analysis showed that for the 5 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.010. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 100 years, respectively. The proposed crossings in Weston County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.014. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 71 years, respectively. The proposed crossings in Weston County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.019. This translates into a range of estimated annual accident frequency from one accident every 66 years to one accident every 53 years, respectively. SEA found the predicted rates to be below the criteria for significance.

Campbell County

20 MNT

SEA's safety analysis showed that for the 6 public highway/railroad at-grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.006 to 0.034. This translates into a range of estimated annual accident frequency from one accident every 167 years to one accident every 29 years, respectively. SEA found the predicted rates to be below the criteria for significance. The proposed crossing at Highway 450, MP 781.00 is classified as Category A. All other proposed crossings in Campbell County are classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.008 to 0.044. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 23 years, respectively. The proposed crossings at Highway 450, MP 781.00 and Bishop Road, MP 828.70 are classified as Category A. All other proposed crossings in Campbell County are classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.011 to 0.054. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 19 years, respectively. The proposed crossings at Highway 450, MP 781.00 and Bishop Road, MP 828.70 are classified as Category A. All other proposed crossings in Campbell County are classified as Category B.

Alternative C (Modified Proposed Action)

The county analysis includes all crossings along the proposed Alternative C alignment except those along the proposed Spring Creek Segment, Phiney Flat Alternative, Hay Canyon Segment, WG Divide Alternative and Oral Segment. The crossings along these segments are analyzed separately under the proceeding headings of this Section.

Pennington County

20 MNT

SEA's safety analysis showed that for the eight proposed public highway/railroad grade crossings for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.022. This translates into a range of estimated annual accident frequency from one accident every 125 year to one accident every 45 years. The proposed crossings in Pennington County are al classified as Category B.

50 MNT

SEA's safety analysis showed that predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 34 years. The proposed crossings in Pennington County are all classified as Category B.

100 MNT

SEA's safety analysis showed that for the eight proposed public highway/railroad at-grade crossings in Pennington County, the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.035. This translates into a range of estimated annual accident frequency from one accident acery 67 years to one accident every 29 years.

Custer County

20 MNT

SEA's safety analysis showed that for the two proposed public highway/railroad grade crossings in Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 34 years. The proposed crossings in Custer County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.021. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 48 years. The proposed crossings in Custer County area all classified as Category B.

100 MNT

SEA's safety analysis showed that for the, the predicted accident frequency at the 100 MNT level of operation would range from 0.011 to 0.021. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident 38 years. The proposed crossings in Custer County area all classified as Category B.

Fall River County

20 MNT

SEA's safety analysis showed that for the 19 proposed public highway/railroad grade crossings for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.005 to 0.031. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 32 years. The proposed crossings in Fall river County are all classified as Category B.

50 MNT

SEA's safety analysis showed that for the 19 proposed public highway/railroad at-grade crossings in Fall River County, the highest predicted accident frequency at the 50 MNT level of operation occurs at U.S. Highway 18 (Milepost 687.40). The predicted rate is 0.020 at both locations, which corresponds to one accident every 50 years. The proposed crossings in Fall River County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.024. This translates into a range of estimated annual accident frequency from once accident every 67 years to one accident every 42 years. The proposed crossings in Fall River County are all classified as Category B.

Niobrara County

20 MNT

SEA's safety analysis showed that for the 3 public highway/railroad at-grade crossings required for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.020. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 50 years, respectively. The proposed crossings in Niobrara County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.026. This translates into a range of estimated annual accident frequency from one accident every 88 years to one accident every 38 years, respectively. The proposed crossing at US Highway 85, MP 741.20 is classified as Category A. All other crossings in Niobrara County are classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.032. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident every 31 years, respectively. The proposed crossing at US Highway 55, MP 741.20 is classified as Category A. All other crossing in Niobrara County are classified as Category B.

Weston County

20 MNT

SEA's safety analysis showed that for the 7 public highway/railroad grade crossings required for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.010. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 100 years, respectively. The proposed crossings in Weston County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.014. This translates into a range of estimated annual accident frequency from one accident every 88 years to one accident every 69 years, respectively. The proposed crossings in Weston County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.019. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident every 53 years, respectively. The proposed crossings in Weston County are all classified as Category B.

Campbell County

20 MNT

SEA's safety analysis showed that for the 6 public highway/railroad grade crossings required for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.006 to 0.022. This translates into a range of estimated annual accident frequency from one accident every 167 years to one accident every 45 years, respectively. The proposed crossings in Campbell County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.008 to 0.028. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 40 years, respectively. The proposed crossing at Bishop Road, MP 828.70 is classified as Category A. All other crossings in Campbell County are classified as Category A.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.011 to 0.035. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 29 years, respectively. The proposed crossings at Wy 450, MP 794.40 and Bishop Road, MP 828.70 are classified as Category A. All other crossings in Campbell County are classified as Category B.

Alternative D (Existing Transportation Corridor)

Pennington County

20 MNT

SEA's safety analysis showed that for the 37 public highway/railroad grade crossings studied in Pennington County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.004 to 0.047. This translates into a range of increase from one accident every 269 years to one accident every 21 years, respectively. The proposed crossings at Wy 450, MP 794.40 and Bishop Road, MP 828.70 are classified as Category A. All other crossings in Campbell County are classified as Category B.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Pennington County of 0.318. This represents a predicted increase of one accident every 3 years. A total of seven accidents occurred at the at-grade crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.007 to 0.076. This translates into a range of increase from one accident every 143 years to one accident every 13 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at Baseline Road, Maple Ave., Omaha Street, 2nd Street, East Blvd., E. Saint Charles Street and E. Saint Patrick Street. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Pennington County of 0.599. This represents a predicted increase of one accident every 2 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.001 to 0.099. This translates into a range of increase from one accident every 1,193 years to one accident every 10 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at

Baseline Road, Maple Ave., Omaha Street, 2nd Street, East Blvd., Steele Ave., E. Saint Charles Street, and E. Saint Patrick Street.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Pennington County of 0.880. This represents a predicted increase of one accident every year.

Custer County

20 MNT

SEA's safety analysis showed that for the 8 public highway/railroad grade crossings studied in Custer County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.005 to 0.020. This translates into a range of increase from one accident every 214 years to one accident every 49 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at U.S. Highway 40. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Custer County of 0.062. This represents a predicted increase of one accident every 16 years. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.008 to 0.032. This translates into a range of increase from one accident every 120 years to one accident every 31 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at U.S. Highway 40. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Custer County of 0.106. This represents a predicted increase of one accident every 9 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.013 to 0.043. This translates into a range of increase from one accident every 79 years to one accident every 23 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at U.S. Highway 40. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Custer County of 0.154. This represents a predicted increase of one accident every seven years.

Fall River County

20 MNT

SEA's safety analysis showed that for the 21 public highway/railroad grade crossings studied in Fall River County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.006 to 0.013. This translates into a range of increase from one accident every 159 years to one accident every 76 years, respectively. SEA found these predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Fall River County of 0.224. This represents a predicted increase of one accident every 4 years. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.011 to 0.018. This translates into a range of increase from one accident every 90 years to one accident every 55 years, respectively. SEA found these predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Fall River County of 0.324. This represents a predicted increase of one accident every 3 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.017 to 0.024. This translates into a range of increase from one accident every 60 years to one accident every 42 years, respectively. SEA found these predicted rates to be below the criteria for significance

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Fall River County of 0.437. This represents a predicted increase of one accident every two years.

Weston County

20 MNT

SEA's safety analysis showed that for the 17 public highway/railroad grade crossings studied in Weston County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.002 to 0.022. This translates into a range of increase from one accident every 411 years to one accident every 45 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at Walker Ave. and Grove Ave. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Weston County of 0.110. This represents a predicted increase of one accident every nine years. No accidents occurred at the at-grade crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.004 to 0.024. This translates into a range of increase from one accident every 227 years to one accident every 41 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at West Main Street, Walker Ave., Grove Ave., E. Rail Road Street, and Highway 116. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Weston County of 0.157. This represents a predicted increase of one accident every 6 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.006 to 0.027. This translates into a range of increase from one accident every 156 years to one accident every 37 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at Whoopup Canyon Road, Old Highway 85, US Highway 85, West Main Street, Walker Ave., Grove Ave., E. Rail Road Street, Skull Creek Road, Baroid Road, Highway 16, Highway 116, and Thorn Road. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Weston County of 0.216. This represents a predicted increase of one accident every five years.

Crook County

20 MNT

SEA's safety analysis showed that for the 5 public highway/railroad grade crossings studied in Crook County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.002 to 0.005. This translates into a range of increase from one accident every 424 years to one accident every 221 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Crook County of 0.015. This represents a predicted increase of one accident every 67 years. One accident occurred in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.004 to 0.006. This translates into a range of increase from one accident every 228 years to one accident every 166 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Crook County of 0.025. This represents a predicted increase of one accident every 40 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.007 to 0.010. This translates into a range of increase from one accident every 138 years to one accident every 99 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at South Big Horn Ave. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Crook County of 0.040. This represents a predicted increase of one accident every 25 years.

Campbell County

20 MNT

SEA's safety analysis showed that for the 19 public highway/railroad grade crossings studied in Campbell County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.007. This translates into a range of increase from one accident every 298 years to one accident every 152 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Campbell County of 0.119. This represents a predicted increase of one accident every eight years. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.005 to 0.011. This translates into a range of increase from one accident every 200 years to one accident every 94 years, respectively. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Campbell County of 0.191. This represents a predicted increase of one accident every 5 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.007 to 0.015. This translates into a range of increase from one accident every 143 years to one accident every 65 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Campbell County of 0.278. This represents a predicted increase of one accident every four years.

Converse County

20 MNT

SEA's safety analysis showed that for the single public highway/railroad grade crossing studied in Converse County, the predicted increase in accident frequency at the 20 MNT level of operation is 0.007. This translates into an increase of one accident every 152 years. SEA found the predicted rate to be below the criteria for significance. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increase in accident frequency at the 50 MNT level of operation is 0.011. This translates into an increase from one accident every 94 years. SEA found the predicted rate to be below the criteria for significance.

100 MNT

SEA's safety analysis showed that the predicted increase in accident frequency at the 100 MNT level of operation is 0.015. This translates into an increase from one accident every 65 years. SEA found the predicted rate to be below the criteria for significance.

4.4.13 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

The new rail line extension would be for the transport of coal from the PRB to coal users. Under Alternatives B or C, no hazardous materials are anticipated to be transported over the new rail line. Alternatives B and C would connect PRB coal mines to the existing DM&E rail line. No users, shippers, or generators of hazardous material would be located or served by either of these alternatives. Alternative D involves reconstruction of sections of DM&E's existing rail line. This rail line is currently available to transport hazardous materials as noted in Section 4.1.11. Any hazardous materials currently transported over this rail line would continue to be transported. No increase in types or amounts of hazardous materials transported on Alternative D are anticipated as a result of this project. However, the transportation of hazardous material along the existing portions of DM&E's rail line would be expected to be safer, with less likelihood of a derailment, due to the improved condition of the rail line.

Hazardous Materials Sites

SEA identified potential impacts on hazardous waste sites in the areas of new construction. Hazardous waste sites are places where releases of hazardous materials have been reported to local, state, or Federal authorities. Related environmental concerns include facilities licensed to treat, store, or dispose of hazardous materials, leaking underground storage tanks (LUSTs), solid waste facilities and landfills (SWFs/LFs). During construction, earthmoving activities could expose contaminants to construction workers, nearby residents, and railway workers. Contaminants may also be exposed to wildlife, vegetation, surface water, and groundwater. If moving away from the initial site, disturbance to soils or local geology can either reduce or accelerate contaminant migration. Because specific site information for each identified site is not available, it is not possible to determine the potential impacts of construction on these sites. DM&E should coordinate with the EPA and South Dakota and Wyoming state agencies to obtain information on the extent of contamination to determine if it occurs within the existing right-of-way, whether construction activities have the potential to impact the site, and any protective actions necessary to avoid disturbance to these sites during construction.

During project operation, no impacts should occur to existing hazardous materials sites. There is the potential for railroad operations such as spills during derailments or improper handling of hazardous materials necessary for normal operations to result in new sites of contamination. However, this is very unlikely due to the expected reduction in derailments and regulations regarding handling, storage, and disposal of hazardous materials.

4.4.14 ENERGY RESOURCES

Transportation of Energy Resources

The proposed project has the potential to significantly impact the transportation of energy resources. Upgrading of the existing DM&E rail line would result from DM&E successfully constructing a rail line extension into the PRB and obtaining contracts to transport coal from the basin to utilities throughout the upper Midwest. As discussed in Chapter 1, this would provide a more cost-effective transportation route for PRB coal. It would help alleviate service and congestion problems at the mines and within the PRB, making transportation of PRB coal for each of the rail carriers serving the basin more efficient and reliable. Energy resources provided by PRB coal would be available to the user at a more economical rate, higher reliability, and greater efficiency.

Utilization of Energy Resources

For many of the same reasons as discussed under Transportation of Energy Resources, the proposed project has the potential to significantly impact the utilization of energy resources, particularly relating to PRB coal and diesel fuel. The shorter route provided by the project would reduce transportation costs for PRB coal, increasing the attractiveness for utilities to switch to PRB coal or increase their use of it. Use of PRB coal is projected to increase and the proposed project would provide additional rail capacity to help the mines meet production projections and reliably deliver the coal to the user, enabling the resource to be utilized.

The shorter route would result in significant fuel saving. Based on mileages to specific power plants discussed in Chapter 2, the DM&E route could provide mileage savings of several hundred miles over the routes of other rail carriers. This would result in a potential savings of hundreds of thousands of gallons of diesel fuel annually, providing a much wiser use of this resource.

Improved utilization of energy resources could also occur at the mines. Mines are not able to expand their present operations beyond the current permitted level. However as discussed in Chapter 1, many of these mines do not currently meet these production levels, in part due to inadequate rail service. Operation of the proposed project may enable these mines to meet permitted production level and thus supply increase amounts of coal to utilities. PRB coal is more economical to mine than many eastern coals due to the relatively shallow overlying layers of soil and the thickness of the coal seams. Much of this economic advantage is due to the lower quantities of energy, such as diesel fuel and electricity, required to operate mining equipment necessary to extract, store, and load the coal. Increased utilization of PRB coal over expanded use of eastern coals would also make more efficient use of the energy necessary to mine coal to provide to the users.

Recyclable Commodities

DM&E currently transported only limited amounts of recyclable commodities. This includes less than 100 carloads annually of scrap steel. However, no shippers of recyclable materials currently have been identified along Alternatives B and C. Rebuilding of existing DM&E rail line as part of Alternative D would likely provide better, more efficient rail service to any shippers of recyclable along the existing rail line portions of Alternative D.

Additionally, the reconstruction of DM&E's existing rail line necessary for Alternative D would require removal of hundreds of miles of rail, thousands of railroad ties, bridge materials, and tons of ballast and other rail bed material. Due to its age, most of the rail would likely be unsuitable for reuse and would be sold for scrap to be recycled. Ties and wooden bridge materials could be sold for landscaping or other uses but most are expected to be in such poor shape that they would be unmarketable. DM&E could potentially sell or give them to electrical utilities currently using ties as a fuel source for electric generation. However, large quantities may require disposal in appropriate landfills. Steel bridge materials which could not be incorporated into upgraded bridges would be sold for scrap. Stone materials in some bridges and culverts may be used in railroad landscaping or sold for that purpose. Unmarketable materials could be used for fill, other aggregate uses, or landfilled. Ballast and other rail bed material no longer suitable for rail operations could be used as fill material or aggregate for other projects such as roadways.

Reconstruction of the existing rail line would not only generate large volumes of potentially recyclable materials, but would also generate a potential market for them, as would Alternatives B and C. Rail and ties generated by other rail carriers construction and abandonment activities could generate materials suitable for use by DM&E. Although these materials would likely be unsuitable for the rail line, they may be usable as part of yard and industrial sidings, spur rail lines to serve existing shippers, or temporarily to complete initial construction should sufficient new materials be unavailable. During operation, these materials would be replaced as new materials became available. However, it is anticipated that new materials would be used for most if not all new rail line construction.

4.4.15 CULTURAL RESOURCES

Impacts to cultural resources would occur if important archaeological or historic sites or structures which could substantially add to scientific understanding of human occupation of the project areas are damaged or destroyed during project construction. The project area has a rich and long history of human occupation and known sites of archaeological significance occur throughout the area. It is highly likely large numbers of yet unknown archaeological sites, many of significant importance to Tribes and the history of the area, exist through out the area and within the rights-of-way of the Extension Alternatives. Damage or destruction of significant archaeological sites would be considered by SEA to be a significant impact.

Archaeological sites could be revealed during construction and excavation for any of the alternatives and would offer the opportunity to recover the artifacts they contain. Given the USFS and BLM standards and guidelines for protection of archaeological resources and the protection afforded them under the National Historic Preservation Act (NHPA), the possibility of irretrievably damaging a resource of scientific significance would be low. Because archaeological resources recovered on private lands remain the property of the landowner, they may be lost to scientific study following their recovery and could be damaged, destroyed, or sold. Cultural resources recovered from Federal lands would be appropriately archived and available for future study.

SEA conducted a literature review to determine the number of archaeological and historic sites within one mile of the Extension Alternatives as discussed in Sections 4.1 and 4.2. This evaluation was conducted to provide an idea of the density of known cultural resources along the alternatives, and thus the likelihood such resources would occur within the right-of-way. Based on this review, SEA determined it is very likely significant archaeological resources would occur with the right-of-way of all the Extension Alternatives. The results of SEA evaluation are provided below for each alternative.

Any impacts to known or discovered cultural resource sites associated with new construction would require mitigation in accordance with the Programatic Agreement (PA) developed for this project. Further evalutation and coordination with the South Dakota and Wyoming State Historic Preservation Officers (SHPO) would be necessary to determine the exact impact and significance of any impacts due to project construction. It is also expected that some of the cultural resources shall be eligible for the National Register as TCP's. No impacts to cultural resources are anticipated from operation of the project alternatives.

Any National Register of Historic Places (NRHP) sites within the construction right-of-way would be adversely affected by construction.

Alternative B (Proposed Action)

<u>South Dakota</u>

Seventy known archaeological sites are within one mile of the proposed right-of-way/construction zone for Alternative B. Fifty-nine of the sites are prehistoric, 9 of the sites are historic, and 2 of the sites have both prehistoric and historic components. None of the sites are listed on the NRHP. However, 6 of the sites are potentially eligible for listing in the NRHP. The information available on the remaining sites indicated that NRHP eligibility is undetermined. Known sites within one mile of the proposed right-of-way/construction zone that are potentially eligible for listing on the NRHP may be adversely affected.

Wyoming

There are 228 known cultural resource sites within 1.0 mile of Alternative B in Wyoming. Of the known sites, 169 are prehistoric, 49 are historic, 3 have both prehistoric and historic components, and 9 are of unknown cultural affiliation. Fifty one of these sites are eligible for or listed on the NRHP. There are 32 sites within the right-of-way for Alternative B. Twenty-three of the sites are prehistoric, 8 are historic and 1 is unkown cultural affiliation. Six of the sites, 2 historic, and 4 prehistoric are eligible for the NRHP.

Alternative C (Modified Proposed Action)

South Dakota

There are 96 known sites within 1 mile of Alternative C. Eighty-three are prehistoric, 9 are historic, and 4 have both prehistoric and historic components. Fifty-two sites are located within the proposed right-of-way/construction zone. Thirty-nine of the sites within the right-of-way/construction zone are prehistoric, 7 are historic, 1 contains both prehistoric and historic components, and 6 contain unknown cultural components. Ten of the sites, including 8 prehistoric, 1 historic, and 1 prehistoric/historic, have been determined not eligible for the NRHP. One historic site is listed as potentially eligible for the NRHP. The remaining sites are listed as unevaluated.

Wyoming

There are 312 known sites within 1.0 mile of Alternative C. These include 217 prehistoric, 48 historic, 4 with both prehistoric and historic components and 43 with unknown cultural affiliation. Of these 49 are eligible for or potentially eligible for the NRHP, 134 have been determined ineligible or destroyed, and 129 have not been evaluated. A total of 34 known sites would be located within the right-of-way for Alternative C. Of these 4 are eligible for the NRHP, 10 are not eligible and 20 have not been evaluated.

Alternative D (Existing Transportation Corridors)

South Dakota

Alternative D has elements of both reconstruction and new construction. Alternative D involves reconstruction of existing DM&E rail line from Wall South, Dakota to Rapid City, South Dakota then to a point approximately 5 miles south of Smithwick, South Dakota. Alternative D then becomes new construction to the South Dakota-Wyoming State line. There are 71 known sites along this portion of the project area in South Dakota. Of the known sites, 56 are prehistoric, 10 are historic, 2 have both prehistoric and historic, and 3 are of an unknown cultural afficliation. Four of the 71 sites are NRHP eligible. Only 9 of the known sites are within the existing right-of-way. All but one of the these sites are prehistoric and the other is historic, all are unevaluated for the NRHP. There are 130 bridges and culverts along the reconstruction portion of Alternative D, 110 are eligible for the NRHP. The bridges are open deck pile timber (83 total with 69 NRHP eligible), deck plate girder (19 total with 15 NRHP eligible), through plate girder (6 total with 5 NRHP eligible), through truss (2 total with both NRHP eligible), I-beam (4 total with 3 eligible), stone box culverts (all 11 NRHP eligible), stone arch culverts (all 3 are NRHP eligible), concrete arch culvert (1 total, NRHP eligible), and wooden box culvert (1 total, NRHP eligible). It is likely that other railroad related facilities (water stops, depots, freight houses, maintenance yards etc.,) would be considered eligible for the NRHP if they are formally evaluated. None of the known archaeological sites are considered eligible for listing on the NRHP.

Wyoming

There are 229 known sites and 59 known isolated finds within one mile of the proposed alignment. Of the known sites, 88 are prehistoric and 42 are historic, the cultural affiliation of 91 of the sites are unknown, and 8 have both historic and prehistoric components. Of the known sites, 2 are listed on the NRHP, 34 are eligible for the NRHP and 117 are not eligible. The remaining 76 sites have not been evaluated. Of the known sites, 36 would be within the proposed right-of-way. Five of the 36 sites within the proposed right-of-way are eligible for the NRHP and 1 is on the NRHP. Of the remaining 31 sites, 15 are not eligible for the NRHP and 16 have not been evalutated.

4.4.16 SOCIOECONOMIC

Socioeconomic impacts resulting from the new build alternatives in South Dakota and Wyoming are anticipated to occur both short term and long term. Short term impacts would be related to construction activities associated with increased construction employment and are anticipated to last approximately two to three years. Long term operational impacts such as railroad-assessed taxes and permanent jobs, could be anticipated for the next several decades. The following discusses those impacts related to the construction of the various Extension Alternatives in South Dakota and Wyoming. Socioeconomic impacts related to rail yards along the Extension Alternatives are discussed in Section 4.9.

4.4.16.1 Population and Demographics

All of the Extension Alternatives would pass through generally the same geographic area of South Dakota and Wyoming. The limited and scattered communities throughout the area are the only sources of goods, services, and facilities required for construction workers. Therefore, all of these communities would likely be affected by any of the Extension Alternatives and each of the Extension Alternatives would have similar impacts on the population of the project area. It is likely that the counties in South Dakota and Wyoming through which the alternatives would be constructed would experience short-term increases in population during construction. Over 900 two to three year jobs are expected that would be directly related to the construction of the Extension Alternatives. While it is likely that many of these would be filled by local workers, other workers specialized in rail construction would likely relocate to the area. Bridge and culvert crews would relocate for the entire period of construction, while rail line workers would only be present during the months of construction (April to November). Construction workers would not likely locate permanently in the area, rather they would move to the area of the next project following completion of their work on this project. They could utilize temporary lodging, such as motels, hotels, rental property, recreational vehicle (RV) parks, and campgrounds where available. If local lodging is utilized, workers would likely relocate throughout construction, moving to be closer to the actual job site. Communities such as Hot Springs, and Edgemont in South Dakota, Newcastle, Douglas, Wright, and Gillette in Wyoming, would be possible locations for workers to find temporary residency. However, DM&E has determined that it would likely be necessary to establish mancamps to accommodate work crews in areas that would be without the necessary services of a nearby town or because adequate facilities for the number of construction workers are not available in nearby communities. DM&E has not indicated the locations, sizes, and facilities for these mancamps. However, they have indicated they would be located so as to avoid environmentally sensitive areas.

During operation of the project, permanent employment would be added to the area along the rail line. The increased traffic on the DM&E rail line would require hiring additional train crews, maintenance personnel, and office staff. Most of these additional, permanent jobs would be associated with rail yards and are discussed in Section 4.9.1.1.9. Additional permanent employees would likely settle in communities, such as Hot Springs, Rapid City, Edgemont, Newcastle, and Gillette, due to their proximity to the rail line.

Table 4.4-40 provides a summary, by county, of the potential direct and indirect construction jobs associated with these alternatives in South Dakota and Wyoming. Because Alternative D would only travel through approximately 15 miles of Crook County, Wyoming, socioeconomic data were considered to be minimal and were therefore not calculated for this county. However, residents of this county would likely take advantage of employment opportunities created by the project, and businesses in Moorcroft could expect increased patronage from construction workers and railroad crews.

Table 4.4-41
Employment Compared to Population Statistics for Potentially Affected Counties

County	Construction Employment		Percent of County Population/County unemployed (1994)	Change in County Population (1986-1994)
	Direct	Indirect		
Pennington	158	107	<1/3.3	11.2
Custer	149	66	3/4.3	4.3-
Fall River	189	84	4/3.8	9.7-
Niobrara	44	13	2/3.6	21.3
Weston	168	50	3/5.9	20.4-
Converse	39	12	<1/5.4	18.7-
Campbell	175	52	<1/5.4	18.8-
Total	922	384		

4.4.16.2 Employment and Income

Construction is anticipated to take two to three years and would occur simultaneously at several locations along the approved rail line alignment. Approximately 498 direct construction related jobs are anticipated for new rail line construction in South Dakota and approximately 427 in Wyoming. These jobs would be spread throughout the project area in each State, with the total number of workers divided into numerous smaller crews responsible for a particular aspect of construction, such as rail bed preparation or rail placement, or completion of a particular geographic area of the project.

Construction jobs would require a wide range of workers and activities. More generalized jobs such as heavy equipment operators, carpenters, electricians, landscapers, truck drivers, and mechanics would likely be filled by local workers, contractors, and farmers and ranchers during slow periods for those activities. However, because of the number of workers required, non-local workers may also be required to fill these positions. Additionally, many unskilled laborer or apprentice positions would also be available. More specialized workers, such as rail construction contractors, would likely be non-local. Such contractors in-state could be utilized. However, as these workers tend to be specialized in what they do and relocate from job to job, they would likely be filled by non-local and out-of-state workers.

In addition to direct construction jobs, approximately 384 indirect jobs are anticipated to be generated by the proposed project. These jobs would occur over the construction period and would likely continue for two to three years after construction completion. These jobs would result from construction workers, both local and non-local, that would be present during construction. Local workers would have consistent income resulting in them having more money to spend locally on goods and services. They would continue to spend following construction completion, thus resulting in the two to three year post-construction requirement for jobs. Non-local workers would spend portions of their income locally, increasing the demand for goods and services. Additionally, non-local workers would require lodging, using local hotels, motels, rental properties, and trailer and RV parks where available. In such cases where lodging and food services would not be available, mancamps would be required. These camps would likely obtain provisions such as food, fuel, and miscellaneous supplies from the nearest town. All these economic sectors would be expected to increase in demand and value due to increased business. New businesses such as grocery stores, convenience stores, gas stations, and bars could be expected, resulting in additional construction activity, providing jobs for construction workers as well as to staff the new business. Table 4.4-42 provides estimates of construction related earning in the project counties. A portion of these earnings would be available to purchase goods and services from local business and provide tax revenues for the State and county.

Table 4.4-42 Construction Earnings by County	
County	**Estimated Earnings ($)**
Pennington	30,844,800
Custer	20,585,500
Fall River	26,179,200
Niobrara	4,959,000
Weston	18,867,000
Converse	4,351,000
Campbell	19,604,000
Total	**125,390,500**

The population in the South Dakota project area counties is over 93,000 with an average unemployment of 3.9 percent. The population on the Wyoming project area counties is over 57,000 with an average unemployment rate of 4.9 percent. At this rate, approximately 3,627 persons are unemployed in the South Dakota project area, and approximately 2,793 persons are umemployed in the Wyoming project area. Although these persons may not have the specific skills for rail line construction, they would likely have job skills that could provide for employment in one or more of the many job areas created during construction, including non-skilled laborer and apprentice positions, and service industries. Workers in laborer and apprentice positions would have the opportunity to learn a skill or trade and obtain permanent employment in that field following completion of rail construction. More skilled workers in many areas could be expected to seek employment at positions created by rail line construction as higher wages would likely be paid for these jobs. This would create positions for less skilled employees as well as opportunities for persons seeking to learn new jobs. Unemployment throughout the project area could be expected to decline. However, the demand for labor could result in competition for workers and thus higher wages and better benefits to attract qualified employees. This seems likely due to the low unemployment within the region.

Access throughout the project area would be provided by state and local roadways. Persons throughout the area would be expected to travel some distance for opportunities at higher wages at jobs related to project construction. Additionally, the attractiveness of many good paying jobs in the area may result in non-local workers or those unemployed relocating in the area in order to seek employment. Such relocations would be minimal and not exected to mpact county-level employment.

DM&E would likely acquire a variety of construction materials and supplies within the immediate and adjacent project area. These could include concrete, steel, ties, rail, ballast rock, fill, subgrade and subballast material, fencing, lumber, and a variety of other materials. It would be preferable to acquire these locally due to increased costs associated with importing materials. While it is likely many materials would not be available locally, many local businesses would be able to provide what materials they could. These businesses would include commercial gravel, rock, and sand quarry operations, hardware stores, lumber yards, ready mix plants, and other construction related material dealers. Providers of these materials could expect increase in sales during the construction period.

During project operation, new permanent jobs related to continuing rail operations would be created. Additional jobs for train crews, maintenance personnel, and office workers would be available. New jobs comparable in salary and benefits to those of other Class I railroads would be expected. These jobs would primarily be associated with rail yards and are discussed in Section 4.9.

Potential project impacts to employment and income are expected to be beneficial and potentially significant, particularly during construction. Employment opportunities are expected to increase and unemployment decrease throughout the area. Lower unemployment would increase the demand for workers, resulting in higher wages and better benefits potentially being offered to attract qualified persons. Following construction, high-paying railroad jobs would continue to benefit the labor market by providing high-paying jobs within the area.

4.4.16.3 Public Services and Fiscal Condition

Impacts to public services and fiscal condition would be similar for each of the new build alternatives. Numerous services are provided by the various counties in the project area as discussed in Section 4.1.14.3 for South Dakota Counties, and Section 4.2.14.3 for Wyoming Counties. The anticipated increase in employment for the project counties would not likely place undue strain on the public services. For Pennington County in South Dakota, and Converse and Campbell counties in Wyoming, the increase in employment represents less than one percent of the total population of the county. Custer and Fall River Counties in South Dakota would experience an increase in employment greater than one percent of the county population. Niobrara and Weston Counties in Wyoming would also experience an increase in employment greater than one percent of the total county population. Each of these counties have experienced decreases in population over the last ten years that would compensate for the employment increase. The employment increase in each project county would be less than the unemployment rate for each county. All the counties should be able to absorb the increases in population, both temporary and permanent, without experiencing any problems in continuing to provide adequate services. In those counties experiencing population declines, increase due to this project may help offset some of the population decline, increasing the county tax base and providing increase revenue for county services.

Counties are able to fund a variety of services by collecting property and other taxes. As part of the proposed project, all the area counties should receive additional tax revenues. These revenues would result from new railroad facilities being constructed, existing facilities upgraded, and increased spending by construction workers and additional permanently employed individuals within the county. Table 4.4-43 provides an estimate of the sales and use taxes generated in each county during project construction due to purchases of materials for construction and spending by construction workers for goods and services. A portion of these taxes would be available to the county.

Table 4.4-43
Sales and Use Taxes Generated by County

County	Taxes ($)
Pennington	3,037,800
Custer	2,238,100
Fall River	3,011,900
Niobrara	942,000
Weston	2,443,000
Converse	525,000
Campbell	2,687,000
Total	**14,884,800**

Additionally, DM&E would pay property taxes on its facilities. These taxes would vary between counties, depending on the actual facilities located in the county and the county's tax assessment rates. Table 4.4-44 provides an estimate of the property taxes DM&E would pay each year under the 40 MNT and 100 MNT operating scenarios.[16] These amounts are compared to the taxes DM&E paid in 1997 and the total taxes collected by the counties in 1997.

Table 4.4-44
Comparison or Property Taxes Paid and Anticipated for the Proposed Project

County	DM&E 1997 Taxes Paid ($)	Taxes Assessed at 40 MNT ($)	Taxes Assessed at 100 MNT ($)	Total Taxes Collected 1997 ($)
Pennington	4,564	1,474,300	1,793,900	3,272,764
Custer	555	1,235,300	1,503,100	2,738,955
Fall River	784	2,496,100	3,037,100	5,533,984
Niobrara	0	268,000	323,000	591,000
Weston	0	1,129,000	1,365,000	2,494,000
Converse	0	221,000	267,000	488,000
Campbell	0	979,000	1,183,000	2,162,000
Total	**5,903**	**7,802,700**	**9,472,100**	**17,280,703**

As can be seen, property taxes under the proposed project would increase substantially over those currently assessed for DM&E. This additional revenue would contribute significant additional funds to each of the counties. These funds would enable the counties to continue to provide their current services, possibly enabling them to upgrade or increase services. Any increase in county population due to the project should easily be accommodated by the increased revenues generated by the project.

Overall, the project should have a beneficial impact on the services offered by the counties and the counties fiscal conditions. Increased tax revenues should easily offset any additional financial burden the project may cause the counties while still providing additional revenues for county services.

[16] The 40 MNT and 100 MNT levels are both included as the increase in operations would require construction of additional facilities that would increase the value of DM&E property within each county. Because the level of operation would be subject to the market, both of these levels are presented for comparison. The 20 MNT level of operation was not evaluated in the economic report prepared for the project. This level of traffic would occur at project startup and is anticipated to only occur for a short time before operating levels increase. Therefore, 40 MNT and 100 MNT likely are a more accurate reflection of the potential long term tax impacts.

4.4.17 ENVIRONMENTAL JUSTICE

SEA conducted an analysis at the census block group level along each of the Extension Alternatives to determine if any of the communities along the alternatives met criteria established for them to be considered potential environmental justice communities, as discussed in Sections 4.1.15 and 4.2.15. SEA identified these communities in order to determine if the different Extension Alternatives would potentially have a disproportionately high and adverse impact on any of these communities. Following completion of its impact analysis, SEA reviewed the potential impacts to the identified minority and low-income communities to identify if significant impacts could occur to these communities. SEA notes that the type and nature of impacts to these communities would be the same as to non-minority and non-low-income communities. However, in consideration of Executive Order No. 12898, SEA considered it appropriate to determine if any of the significant impacts resulting from the Extension Alternatives would be borne disproportionately by environmental justice communities.

SEA found the impact of increased noise due to operation of locomotives to be the only significant impact that would potentially occur to enviromental justice communities. SEA considered noise levels of greater than 65 dBA L_{dn} due to both wayside and horn noise to be high and adverse. As part of its analysis, SEA determined that environmental justice communities would disproportionately bear the impacts of increased noise levels along Alternative D. SEA's analysis found that disproportionate noise impacts would occur to one low-income community in Wall and four minority communities in Rapid City (Appendix D). All of these communities occur along the existing DM&E rail line portion of Alternative D.

4.4.18 RECREATION

Potential impacts to recreation would occur if construction or operation of the alternatives resulted in:

- Introduction of noise or light pollution into national or state parks or monuments.
- Loss of recreational lands or suitability of lands for recreational activities.
- The elimination of an area or portion of an area from eligibility for designation as wilderness.
- The elimination of the wild and scenic river status or eligibility of all or a portion of any stream or river.
- Disturbance or elimination of recreational opportunities.

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- The elimination of the wild and scenic river status or eligibility of all or a portion of any stream or river.
- Disturbance or elimination of recreational opportunities.

One of the important characteristics of the project area is the feeling of remoteness it provides to individuals. The absence of unnatural sights and sounds combined with the wide viewshed provide a feeling of remoteness, vastness, and wilderness. During nighttime hours, areas along the rail line where no unnatural lights are visible, providing opportunities for star gazing. The lack of noticable light also contributes to the sense of wilderness and remoteness the person may experience. Quiet contemplation is considered an important component of recreation throughout the project area. These qualities, combined with the abundant recreational opportunities of the area (hunting, fishing, bird watching, camping, hiking, touring) on both private and abundant public lands, help to provide a quality recreational experience for local residents and visitors.

Construction activities would create noise and light that would be unnatural to the area. Construction noise has the potential to disturb a wide variety of recreational activities on those lands adjacent to the rail line. Construction lighting would be visible for significant distances, adding to the unnatural character of the area and contributing light pollution that may reduce the visibility of the night sky. Additionally, thousands of acres of public and private land, much of which has recreational value, would be converted to rail line right-of-way and no longer available for recreational use. Adjacent areas also may also be undesirable for recreation due to the noise and human activity associated with construction and noise and disturbance from passing trains during rail line operation.

Because of the undeveloped and remote character of the project area, several areas have been considered for classification as wilderness. These include the Red Shirt and Cheyenne River RARE II areas. Additionally, the HA Divide and Red Hills Inventoried Roadless Areas (considered to potentially meet the criteria for wilderness designation) and the Sage Creek Wilderness Area occur within the project area. Construction of a rail line across these lands would likely introduce a type of development that would make these areas no longer eligible for wilderness designation. Such areas are becoming increasingly uncommon due to encroachment of development. Additionally, operation of a rail line in close proximity would introduce unnatural sights and sounds that could make these areas or portions of these areas ineligible for wilderness designation.

Streams and rivers with scenic or wilderness characteristics still in their free-flowing condition may be designated as Wild and Scenic under the National Wild and Scenic Rivers Act of 1968 (P.L. 90-542; 16 U.S.C. 1271-1287) to protect the natural qualities they provide. Entire streams and rivers or identified stretches of streams and rivers may be so designated. As with wilderness areas, construction and operation of a rail line in proximity to such waterways could introduce unnatural sights and sounds that would result in the stream no longer being eligible for such a designation.

Alternative B (Proposed Action)

Alternative B would cross 67.7 miles of public land, including 51.9 miles (2,516.4 acres) managed by the USFS, 5.7 miles (276.4 acres) managed by the BLM, and 10.1 miles (489.7 acres) owned by South Dakota or Wyoming. Alternative B would cross both the Red Shirt and Cheyenne River RARE II areas, and the Red Shirt Inventoried Roadless area. It would also pass within 200 feet of the HA Divide Inventoried Roadless area and be located across the Cheyenne River from the Indian Creek RARE II area.

Alternative B would be within 3,700 feet of Badlands National Park. Some of the most striking qualities of Badlands are its wilderness character, quiet and solitude. Quiet contemplation is an important park experience. Operating a railroad in close proximity to the park would have an adverse impact on these qualities in those portions of the park where they would be noticable. Alternative B would parallel the approximately 8.0-mile stretch of the Cheyenne River between the community of Red Shirt and its confluence with Battle Creek, considered by the USFS to be eligible for designation as Wild and Scenic. Construction and operation of Alternative B would make this stretch of the river ineligible due to the proximity of the rail line to the river and the visual intrusion it would create.

Alternative C (Modified Proposed Action)

Alternative C would cross 55.5 miles of public land, including 38.9 miles (1,886.1 acres) managed by the USFS, 4.9 miles (237.6 acres) managed by the BLM, and 11.7 miles (567.3 acres) owned by South Dakota or Wyoming. Although Alternative C does not cross any RARE II areas, it would be within 500 feet of the Red Shirt and Cheyenne River RARE II areas and the Red Shirt Roadless Area. No parks, wild and scenic rivers, or natural landmarks would be affected by this alternative.

Alternative D (Existing Corridors Alternative)

Alternative D would cross 40.5 miles of public land, including 26.7 miles (647.3 acres) managed by the USFS, 3.0 miles (72.7 acres) managed by the BLM, and 10.8 miles (261.8 acres) owned by South Dakota or Wyoming. No parks, wild and scenic rivers, or natural landmarks would be affected by this alternative.

4.4.19 AESTHETICS

4.4.19.1 Visual Resources

Impacts to visual resources are difficult to determine due to the differences in what individuals perceive as scenic and of scenic value. No designated scenic areas or overlooks occur along the project alternatives. However, numerous areas that could be considered scenic would be affected by construction and operation of a rail line introducing an unnatural component to the landscape. The USFS has attempted to quantify the scenic value of its lands based on the visual quality objective (VQO) established by the USFS for an area.

The USFS uses VQOs to define the acceptable degrees of natural landscape alteration. All of the alternatives cross USFS lands which have an existing VQO of modification and partial retention. A designation of modification allows development to occur, even development considered to have significant contrast to the existing landscape. However, facilities, buildings, roads, and signs must conform to the existing environment in terms of color, textures, and materials. The partial retential VQO designation is typically restricted to riparian corridors and waterbodies, and activities must be subordinate to the surrounding environment. In these areas the construction of the railroad is expected to cause significant impacts to visual resources.

As discussed in Section 4.4.8, concerns were expressed by several Federal agencies for the potential impacts of the project to the visibility at Class I areas. SEA conducted CALPUFF modeling to determine the potential visibility impairment at these areas due to the Extension Alternatives. The results of this analysis are discussed in detail in Section 4.4.8.

Alternative B (Proposed Action)

Alternative B would cross 11.6 miles of BGNG that have VQO of modification. In Wyoming, this alternative would cross 30.7 miles of TBNG with a VQO of modification. The alternative would cross 2.6 miles of BGNG with a VQO of partial retention. In Wyoming, this alternative would affect 4.9 miles of TBNG with a VQO of partial retention.

Alternative C (Modified Proposed Action)

Alternative C would cross 5.2 miles of BGNG with a VQO of modification. In Wyoming, this alternative would cross 28.4 miles of TBNG with a VQO of modification.
In South Dakota, this alternative would cross 0.7 miles of BGNG with a VQO of partial retention. In Wyoming, this alternative would affect 4.4 miles of TBNG with a VQO of partial retention.

Alternative D (Existing Corridors Alternative)

Alternative D would not cross any USFS lands in South Dakota. Therefore, no impacts to visual resources would occur. This alternative would cross 22.7 miles of TBNG with a VQO of modification and 4.0 miles with a VQO of partial retention. Because this alternative would be constructed adjacent or close to an existing rail road, visual impacts would be reduced compared to Alternatives B and C.

4.4.19.2 Nightlights

In the event that it would become necessary for construction crews to work during the dark hours, the use of artificial lighting during the construction phase of the project would result in light pollution impacts in the area. If near the proposed rail line, construction, security, or other associated lighting could disturb residents trying to sleep. Such lighting may be recognized by local residents as unusual, but it is not anticipated to detract from the nature of the night environment as discussed in Section 4.4.19.1. Minimal impacts from lighting along the rail line would be expected due to the sparse population in the proposed construction area and the movement along the rail line as construction proceeds. Nightlights would only occur at scattered locations over the two to three year construction period.

During rail line operation, the lights from passing trains during dark hours may have minor impacts on the people living near the rail line. However, any impacts would be restricted to those residents in close proximity to the rail line. Because train headlights would be directed down the rail line, impacts would be minimal and similar to those that presently occur due to other types of traffic in the area. Any changes in nightlights resulting from construction and operation would not significantly alter the night environment of the project area.

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4.5 SPRING CREEK ALTERNATIVES

As discussed in Chapter 2, two alternative routes have been established for use with Alternatives B and C in the Spring Creek area of South Dakota. The Spring Creek Segment was the original alignment for both alternatives and it generally followed Spring Creek. Because of environmental concerns with this alignment, particularly its proximity to the Cheyenne River, wetlands along Spring Creek, and USFS RARE II areas it would cross, an alternative alignment, the Phiney Flat Alternative, was developed. Either of these alternatives could be used with either Alternative B or C. The following discussion provides a comparison of the potential impacts of these two alternatives. In general, the impacts for the Spring Creek Segment are the same for Alternatives B and C. However, the alignment established along this segment does vary slightly between Alternative B and C. When differences in potential impacts exist due to the differences in alignment, the Spring Creek Segment is discussed by Alternative B and C. Information on the existing environment along these alternative alignments is provided in Section 4.1. More detailed discussion of the types, nature, and significance of impacts to the various resources discussed is included under each resource topic in Section 4.4.

4.5.1 GEOLOGY AND SOILS

Section 4.4.5 discusses the potential impacts to geology and soils that could result from new rail line construction and operation. Impacts would generally be expected to occur during the construction of new rail line and would include creation of unstable areas leading to slope slumps or landslides, clearing and soil disturbance resulting in increased erosion, and loss or damage to paleontological resources.

4.5.1.1 Geologic Hazards

Spring Creek - Alternative B

This alternative would cross 3.1 miles (approximately 150.3 acres) of soils that have a high slump/landslide potential. The clay-mineral content of these rocks is moderate to high, so they are susceptible to slumps and earth flows. The potential for slumps or landslides would be high where this alternative would cross steep slopes, approximately 4.4 miles.

Spring Creek - Alternative C

This alternative would cross 2.6 miles (approximately 126.1 acres) of soils that have a high slump/landslide potential. As with the other alternatives, the potential for slumps or landslides would be high where this alternative would cross steep slopes (approximately 3.1 miles) or where cutting or loading of slopes or unusually high precipitation may cause landsliding in these formations.

Phiney Flat

This alternative would cross 1.7 miles (approximately 82.4 acres) of soils that have a high slump/landslide potential. However, this alternative would cross primarily level terrain (only 1.6 miles of steep slopes) which should not be prone to slumping.

4.5.1.2 Soil Impacts

Spring Creek - Alternative B

The impacts to soil would be similar to the other portions of the Extension Alternatives, discussed in Section 4.4.5.3, which include the loss of topsoil, sedimentation, erosion and the possibility of the introduction and establishment of noxious weeds. The Spring Creek Segment of Alternative B would disturb approximately 412.1 acres of soil over its 8.5-mile length. This alternative would cross 4.2 miles (206.6 acres) of soils with an erosion hazard. No prime farmland would be impacted by this alternative.

Spring Creek - Alternative C

The Spring Creek Segment for Alternative C would disturb approximately 412.1 acres of soil over its 8.5-mile length. This alternative would cross 4.2 miles (206.6 acres) of soils with an erosion hazard. This alternative would cross 0.3 mile (approximately 14.5 acres) of prime farmland.

Phiney Flat

The 10.3-mile Phiney Flat Alternative would disturb approximately 499.4 acres of soil. This alternative would not cross any soils with an erosion hazard. This alternative would cross 3.6 miles (approximately 174.5 acres) of soils classified as prime farmland.

4.5.1.3 Paleontological Resources

Spring Creek - Alternative B

This alternative would cross a total of 1.5 miles (approximately 72.7 acres) of formations with a PFYC of 5. Impacts to these areas would be similar to those discussed for the other areas of Alternative B (Section 4.4.4.5) and include the chance of destruction of important fossils, particularly vertebrate fossils such as dinosaurs and prehistoric mammals.

Spring Creek - Alternative C

This alternative would cross 3.3 miles (approximately 160.0 acres) of formations with a PFYC of 5. Impacts would be similar to those discussed for the other areas of Alternative C (Section 4.4.4.5).

Phiney Flat

This alternative would cross 10.2 miles (approximately 494.5 acres) of formations with a PFYC of 5. Impacts would be similar to those of the Spring Creek Segment.

4.5.2 LAND USE

Potential project impacts to land use would include conversion of current land use to rail line right-of-way, preclusion of existing land uses within the right-of-way, and incompatibility with adjacent land uses. These impacts and others are discussed in more detail in Section 4.4.6. The following provides an overview of the land use types affected by each of the Spring Creek Alternatives.

4.5.2.1 Agriculture

Spring Creek - Alternative B

This alternative would cross 8.5 miles (approximately 412.2 acres) of rangeland. Impacts to this resource would be similar to those discussed in Section 4.4.6.1, including the direct loss of forage during construction, fragmentation of allotments, isolation of water sources and disruption of operations. The Spring Creek Segment of Alternative B would cross 3 Federal grazing allotments. The total amount of allotment disturbance would be 52 acres and result in the loss of approximately 16 AUM's.

Spring Creek - Alternative C

This alternative would cross 7.9 miles (approximately 383.0 acres) of rangeland and 0.6 miles (approximately 29.1 acres) of cropland. Impacts to this resource would be similar to those mentioned above. No Federal grazing allotments would be affected by this alternative.

of Alternative B (Section 4.4.4.5) and include the chance of destruction of important fossils, particularly vertebrate fossils such as dinosaurs and prehistoric mammals.

Spring Creek - Alternative C

This alternative would cross 3.3 miles (approximately 160.0 acres) of formations with a PFYC of 5. Impacts would be similar to those discussed for the other areas of Alternative C (Section 4.4.4.5).

Phiney Flat

This alternative would cross 10.2 miles (approximately 494.5 acres) of formations with a PFYC of 5. Impacts would be similar to those of the Spring Creek Segment.

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Potential project impacts to land use would include conversion of current land use to rail line right-of-way, preclusion of existing land uses within the right-of-way, and incompatibility with adjacent land uses. These impacts and others are discussed in more detail in Section 4.4.6. The following provides an overview of the land use types affected by each of the Spring Creek Alternatives.

4.5.2.1 Agriculture

Spring Creek - Alternative B

This alternative would cross 8.5 miles (approximately 412.2 acres) of rangeland. Impacts to this resource would be similar to those discussed in Section 4.4.6.1, including the direct loss of forage during construction, fragmentation of allotments, isolation of water sources and disruption of operations. The Spring Creek Segment of Alternative B would cross 3 Federal grazing allotments. The total amount of allotment disturbance would be 52 acres and result in the loss of approximately 16 AUM's.

Spring Creek - Alternative C

This alternative would cross 7.9 miles (approximately 383.0 acres) of rangeland and 0.6 miles (approximately 29.1 acres) of cropland. Impacts to this resource would be similar to those mentioned above. No Federal grazing allotments would be affected by this alternative.

Phiney Flat

This alternative would cross 4.6 miles (approximately 223.0 acres) of rangeland and 5.7 miles (approximately 276.4 acres) of cropland. Impacts to this resource would be similar to those mentioned above; however, this alternative would cross fewer miles than either of the Spring Creek alignments. No Federal grazing allotments would be affected by this alterative.

4.5.2.2 Residential

No impacts to residential areas are expected for any of these alternatives.

4.5.2.3 Business and Industrial

No impacts to business and industrial areas are expected for any of these alternatives.

4.5.2.4 Mineral and Mining

No impacts to mineral resources are expected for any of these alternatives.

4.5.2.5 Federal Lands

4.5.2.5.1 Forest Service Lands

Spring Creek - Alternative B

This alternative would cross 1.4 miles (approximately 67.9 acres) of semi-primitive motorized USFS lands. Impacts to these lands would include noise from railroad construction and operation and the visual intrusion of a new rail line, rail bed, and right-of-way. Additionally, since the railroad would not be compatible with the semi-primitive motorized designation, it would be likely that these lands would be degraded to a lower Recreational Opportunity Spectrum (ROS) designation.

Spring Creek - Alternative C

This alternative would not impact any USFS lands.

Phiney Flat

These alternatives would not impact any USFS lands.

4.5.2.5.2 Bureau of Land Management Lands

No impacts to BLM lands are expected for any of the alternatives.

4.5.2.5.3 Bureau of Reclamation Lands

No impacts to Reclamation lands are expected for any of the alternatives.

4.5.2.5.4 Fish and Wildlife Service Lands

No impacts to USFWS lands are expected for any of the alternatives.

4.5.2.6 Reservation and Treaty Lands

No impacts to these lands are expected for any of the alternatives.

4.5.3 WATER RESOURCES

4.5.3.1 Surface Water Impacts

Potential types of impacts to water resources are discussed in detail in Section 4.4.7. Construction and operation of a new rail line could affect water resources by increasing erosion into the water and subsequently reducing water quality, disturbing or altering the stream causing changes in stream hydrology, contaminating water in the event of a spill, and damage to or loss of wetlands.

Spring Creek - Alternative B

This alternative would cross 16 perennial and 23 intermittent streams. Construction impacts would be limited to the period of construction and reclamation and would occur primarily at the crossing locations. Impacts could likely include increased erosion and sedimentation, increased water temperature and loss of habitat for aquatic and terrestrial species.

Spring Creek - Alternative C

This alternative would cross 26 perennial and 44 intermittent streams. Impacts would be similar to those discussed for Spring Creek Alternative for Alternative B.

Phiney Flat

This alternative would cross 1 perennial and 13 intermittent streams. This alternative would have fewer potential impacts to water resources than the Spring Creek Alternatives since it has fewer stream crossings. Impacts would be similar to those discussed above.

4.5.3.2 Wetlands

Spring Creek

This alternative would cross 0.2 mile (approximately 9.7 acres) of forested wetlands. These wetlands would be lost through conversion to rail line right-of-way.

Phiney Flat

This alternative would cross approximately 1.0 acre of emergent wetlands. These wetlands would be lost through conversion to rail line right-of-way.

4.5.4 AIR QUALITY

Construction of the Spring Creek Segment or Phiney Flat Alternative has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

SEA calculated the increase in air pollutant emissions that would result from increased rail operations for these alternatives. The air pollutant emission sources from trains include emissions from the locomotives operating along the new rail line alternatives. A summary of the potential emission increases are shown in Tables 4.5-1 to 4.5-6. These emissions are in addition to those presented in Tables 4.4-2 to 4.4-10 for the other portions of the Extension Alternatives.

Table 4.5-1
Comparison of Emission Increases to EPA Thresholds for the 20 million net tons/year for Spring Creek Segment

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington/ Custer	43.29	100	2.70	100	7.26	100	1.83	100	4.55	100	0.00015	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 8.5

Table 4.5-2
Comparison of Emission Increases to EPA Thresholds for the 20 million net tons/year for Phiney Flat Alternative

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington/ Custer	52.45	100	3.28	100	8.80	100	2.22	100	5.51	100	0.00018	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 10.3

Table 4.5-3
Comparison of Emission Increases to EPA Thresholds for the 50 million net tons/year for Spring Creek Segment

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington/ Custer	**102.98**	100	6.43	100	17.28	100	4.35	100	10.82	100	0.0004	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 8.5

Table 4.5-4
Comparison of Emission Increases to EPA Thresholds for the 50 million net tons/year for Phiney Flat Alternative

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington/ Custer	**124.79**	100	7.79	100	20.94	100	5.28	100	13.11	100	0.0004	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 10.3

Table 4.5-5
Comparison of Emission Increases to EPA Thresholds for the 100 million net tons/year for Spring Creek Segment

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington/ Custer	**201.05**	100	12.56	100	33.74	100	8.50	100	21.12	100	0.0007	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 8.5

Table 4.5-6
Comparison of Emission Increases to EPA Thresholds for the 100 million net tons/year for Phiney Flat Alternative

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington/ Custer	**243.63**	100	15.22	100	40.89	100	10.30	100	25.59	100	0.0008	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 10.3

Based on SEA's analysis, NO_x emissions are predicted to exceed EPA thresholds at the 50 MNT and 100 MNT levels of operation for both the Spring Creek and Phiney Flat alignments. Therefore, the results of the CALPUFF air dispersion modeling were reviewed to determine if the impacts from the new rail traffic would be expected to exceed the NAAQS or PSD Class II increments. These increments are presented in Section 4.4.8. The results of the CALPUFF analysis indicated there would be no exceedence of either the NAAQS or PSD Class II increments (Appendix E).

Additionally, SEA used the CALPUFF model to determine the potential impacts of the Extension Alternatives to the visibility at Class I airsheds. This analysis included emissions over these alternatives. The results of SEA's visibility analysis are presented in Section 4.4.21.

4.5.5 NOISE

The construction and operation of the Spring Creek Segment and Phiney Flat Alternative would increase noise levels along the rail line, as discussed in Section 4.4.9. Operation of construction equipment and train traffic meeting the Board's environmental analysis threshold for noise evaluation would occur along the entire alignment of these alternatives. Tables 4.5-7 through 4.4-12 show the number of noise sensitive receptors expected to experience noise levels exceeding 65 dBA L_{dn} and the county within which each receptor occurs. County totals are in bold and include both the sensitive receptors within and outside the communities. Noise sensitive receptors within the 65 dBA L_{dn} noise level due to wayside noise, wayside and horn noise, and horn noise only are provided. Tables 4.4-13 through 4.4-18 show the same information but for the number of noise sensitive receptors exceeding 70 dBA L_{dn}. No communities would be affected by either alternative.

Table 4.5-7
Spring Creek Segment
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 8 Trains Per Day

Wayside	Wayside/Horn	Horn	Total
1	0	0	1

Table 4.5-8
Phiney Flat Alternative
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 8 Trains Per Day

Wayside	Wayside/Horn	Horn	Total
0	0	1	1

Table 4.5-9
Spring Creek Segment
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 18 Trains Per Day

Wayside	Wayside/Horn	Horn	Total
1	0	1	2

Table 4.5-10
Phiney Flat Alternative
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 18 Trains Per Day

Wayside	Wayside/Horn	Horn	Total
0	0	1	1

Table 4.5-11
Spring Creek Segment
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 34 Trains Per Day

Wayside	Wayside/Horn	Horn	Total
1	0	1	2

Table 4.5-12
Phiney Flat Alternative
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 34 Trains Per Day

Wayside	Wayside/Horn	Horn	Total
0	0	3	3

Table 4.5-13 Spring Creek Segment Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 8 Trains Per Day			
Wayside	**Wayside/Horn**	**Horn**	**Total**
0	0	0	0

Table 4.5-14 Phiney Flat Alternative Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 8 Trains Per Day			
Wayside	**Wayside/Horn**	**Horn**	**Total**
0	0	0	0

Table 4.5-15 Spring Creek Segment Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 18 Trains Per Day			
Wayside	**Wayside/Horn**	**Horn**	**Total**
0	0	0	0

Table 4.5-16 Phiney Flat Alternative Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 18 Trains Per Day			
Wayside	**Wayside/Horn**	**Horn**	**Total**
0	0	0	0

Table 4.5-17 Spring Creek Segment Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 34 Trains Per Day			
Wayside	**Wayside/Horn**	**Horn**	**Total**
0	0	1	1

Table 4.5-18 Phiney Flat Alternative Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 34 Trains Per Day			
Wayside	**Wayside/Horn**	**Horn**	**Total**
0	0	1	1

The scattered, rural nature of the project area for these alternatives results in few noise-sensitive receptors being exposed to noise levels of concern. Even at the 100 MNT level of operation, only two and three noise sensitive receptors would experience noise levels of 65 dBA L_{dn} or greater for the Spring Creek Segment and Phiney Flat Alternative, respectively. Only one of these receptors would be exposed to noise levels of 70 dBA L_{dn} or greater for each of these alternatives, and only under the 100 MNT level of operation. One house located along the Spring Creek Alternative would be within 100 feet of the proposed alignment. No houses along the Phiney Flat Alternative would be located within 100 feet of the proposed alignment. Neither of these alternatives is considered by SEA to have a significant impact on noise sensitive receptors.

4.5.6 BIOLOGICAL RESOURCES

4.5.6.1 Vegetation

Impacts to vegetation from the Spring Creek Alternatives would be similar to those discussed in Section 4.4.10. They would primarily include the loss of vegetative cover due to construction activities converting the area to rail line right-of-way.

Spring Creek - Alternative B

This alternative would cross 8.3 miles (approximately 402.4 acres) of grasslands and 0.2 mile (9.7 acres) of forested wetlands.

Spring Creek - Alternative C

This alternative would cross 7.7 miles (approximately 373.3 acres) of grasslands, 0.6 mile (approximately 29.1 acres) of cropland and pasture, and 0.2 mile (approximately 9.7 acres) of forested wetlands.

Phiney Flat

The Phiney Flat Alternative would cross 4.6 miles (approximately 223.0 acres) of grasslands, 5.7 miles (approximately 276.4 acres) of croplands and pastures, and 1.0 acre of emergent wetlands.

4.5.6.2 Wildlife

4.5.6.2.1 Big Game

Impacts to big game would be similar to those mentioned previously in Section 4.4.11.1. The only quantifiable impact to big game is the amount of habitat in the species' seasonal ranges converted to rail line right-of-way. Table 4.5-19 lists the number of miles of seasonal ranges crossed by each alternative and the acres converted to rail line right-of-way.

Table 4.5-19
Comparison of Big Game Seasonal Ranges between the Spring Creek Alternatives

Big Game Species and Seasonal Range Category	Spring Creek - Alternative B		Spring Creek - Alternative C		Phiney Flat	
	miles	acres	miles	acres	miles	acres
Pronghorn						
Winter Range	8.5	412.1	8.5	412.1	1.3	63.0
Yearlong Range	<0.1	<4.8	1.5	72.7	9.4	455.8
Mule Deer/White-tailed Deer						
Winter Range	8.3	402.4	8.1	392.7	1.6	77.6
Yearlong Range	8.5	412.1	8.5	412.1	10.3	499.4

* In South Dakota, lands may be classified as more than one type of seasonal range, therefore the totals for ranges may be greater than the length of the Alternative.

4.5.6.2.2 Game Species

Upland Game Birds

Construction and operation impacts resulting from new rail line to upland game birds are discussed in detail in Section 4.4.11.2. Impacts would include habitat fragmentation and loss and noise disturbance, particularly to mating rituals performed by male sage grouse during the spring mating season. However, impacts to sage grouse are not anticipated as no sagebrush habitat is crossed by these alternatives. Leks identified along the alternatives are therefore likely sharp-tailed grouse leks to which some disturbance may occur. Upland game birds could also be subject to direct mortality during construction and operation of any alternative.

Spring Creek - Alternative B

This alternative would have 1 grouse lek within 0.25 mile and 3 leks within 1.0 mile. No sagebrush habitat suitable for sagegrouse, but approximately 0.2 mile (9.7 acres) of woodland habitat suitable for wild turkey roosting and cover would be converted to rail line right-of-way by this alternative.

Spring Creek - Alternative C

This alternative would have 1 grouse lek within 0.25 mile and 2 leks within 1.0 mile. No sagebrush habitat suitable for sagegrouse and no woodland habitat suitable for wild turkey roosting and cover would be crossed by this alternative.

Phiney Flat

This alternative would have 2 grouse leks within 0.25 mile and 3 leks within 1.0 mile. No sagebrush habitat suitable for sagegrouse and no woodland habitat suitable for wild turkey roosting and cover would be crossed by this alternative.

Waterfowl

Potential impacts to waterfowl from construction and operation of new rail line are discussed in detail in Section 4.4.11.2. Impacts from these alternatives would generally include loss of nests and nesting habitat in grassland areas, loss of wetland habitat for adults and brood rearing, and disturbance.

Spring Creek - Alternative B

This alternative would convert 8.3 miles (approximately 402.4 acres) of grassland habitat to rail line right-of-way. It would cross 16 perennial and 23 intermittent streams and would convert approximately 9.7 acres of forested wetlands to rail line right-of-way.

Spring Creek - Alternative C

This alternative would convert 7.7 miles (approximately 373.3 acres) of grassland habitat and 0.6 mile (29.1 acres) of cropland and pasture that could provide nesting habitat for waterfowl to rail line right-of-way. It would cross 26 perennial and 44 intermittent streams and would convert approximately 9.7 acres of forested wetlands to rail line right-of-way.

Phiney Flat Alternative

The Phiney Flat Alternative would convert approximately 4.6 miles (223.0 acres) of grasslands and 5.7 miles (276.4 acres) of croplands and pasture that could provide nesting habitat for waterfowl to rail line right-of-way. This alternative would not result in any significant loss of wetlands but would require new crossings for 1 perennial and 13 intermittent streams.

Small Game and Furbearers

Potential impacts from new rail line construction and operation to small game animals and furbearers are discussed in Section 4.4.11.2. Those impacts would be similar to the types of impacts expected from either the Spring Creek Segment or Phiney Flat Alternative. As these species are found in nearly all habitats and are wide ranging, construction of either alignment would have the potential to disturb them and reduce their habitat. Both alternatives would also likely result in some mortality to these species during operation. However, because the Spring Creek Segment generally follows the riparian areas of the drainage and includes numerous crossing of Spring Creek, it would likely affect a larger amount of habitat for furbearers, as these species would tend to utilize the riparian areas along the creek much more than the grasslands and croplands along Phiney Flat. This would be especially true for species such as beaver, mink, and muskrat.

4.5.6.2.3 Non-Game Species

Amphibians and Reptiles

The construction and operation impacts to amphibians and reptiles discussed in Section 4.4.11.3 would be similar to those expected for the Spring Creek Segment and Phiney Flat Alternative. Reptiles and amphibians could occur anywhere along the alternatives and their lack of mobility makes them susceptible to mortality during construction and operation of a rail line. However, the Spring Creek Segment would likely have a greater impact to these species due to its location along Spring Creek, which provides a reliable source of water for amphibian habitat and breeding and foraging areas for reptiles, as well as potential habitat for such species as aquatic turtles and water snakes.

Songbirds

The primary impact to songbirds from construction and operation of the proposed alignment alternatives would be the loss of nesting habitat. Songbirds within the project area include both ground and tree nesters. However, the limited amount of woody vegetation in the area make loss of this type of habitat more important to the species that utilize it. The Spring Creek Segment would convert approximately 9.7 acres of woodlands to rail line right-of-way while the Phiney Flat Alternative would result in no loss of woodland. Additionally, the Spring Creek Segment would also convert between approximately 378.2 and 402.4 acres of grassland to rail line right-of-way compared to 223.0 acres of grassland for Phiney Flat Alternative, a better habitat for ground nesting birds than the remaining 276.4 acres of cropland and pasture found along the Phiney Flat Alternative.

Shorebirds

Impacts to shorebirds would be similar to those discussed for waterfowl. The Spring Creek Segment would likely have a greater impact on shorebirds than Phiney Flat Alternative because the Spring Creek Segment would have numerous crossings of Spring Creek and cross more riparian areas.

Small Mammals

Small mammals would be impacted during construction and operation by loss of habitat and mortality, as discussed in Section 4.4.11.3. Small mammals are expected to occur throughout the project area and along both alternatives. Differences in habitat (grassland and woodland for Spring Creek and grassland, pasture, and cropland for Phiney Flat) may result in different species or numbers of individuals of a species along the alternative alignments. Loss of habitat and any mortality are expected to be similar for both alternatives due to the similar habitats affected. Overall, the Spring Creek Segment would likely be of greater impact than the Phiney Flat Alternative due to the loss of approximately 9.7 acres of woodland. Because this habitat is uncommon in southwestern South Dakota, those species relying on it have fewer adjacent areas to move into. However, because of the high reproductive potential of small mammal species and the limited amount of woodland lost, both the alternatives would have similar and generally minimal impacts to small mammal populations.

Raptors

The potential impacts to raptors from the Spring Creek Segment and Phiney Flat Alternative would be similar to those discussed in Section 4.4.11.3. However, no raptor nests would be impacted by either of these alternatives. Woodland habitat (9.7 acres plus adjacent areas that would be disturbed by construction and operation activities) potentially providing nesting trees for raptors would be lost along the Spring Creek Segment. Both alternatives would convert foraging lands and potential ground-nesting habitat to rail line right-of-way. Raptors could be struck by trains if feeding on carrion along the rail line during the winter.

Aquatic and Fisheries

Potential impacts to aquatic and fishery resources include loss of habitat and reduced water quality as discussed in Section 4.4.11.4. No trout streams are crossed by either of the alternatives. Impacts to aquatic and fishery resources would be most likely to occur in areas where the alternatives are in close proximity to streams or drainages or at stream crossings.

Spring Creek - Alternative B

This alternative would cross 16 perennial and 23 intermittent streams. Approximately 7.5 miles of the Spring Creek Segment would be within the Spring Creek drainage valley.

Spring Creek - Alternative C

The Spring Creek Segment for Alternative C would cross 26 perennial and 44 intermittent streams. Approximately 7.5 miles of the Spring Creek Segment would be within the Spring Creek drainage valley.

Phiney Flat

This alternative would cross 1 perennial and 13 intermittent streams. Except for one crossing of Spring Creek, this alternative would not be within any perennial drainageway. Rather, it would be located across the relatively flat area (Phiney Flat) located between Spring Creek and the Cheyenne River. The Phiney Flat Alternative would generally be approximately one mile or more from these drainages.

4.5.6.3 Endangered, Threatened, and Sensitive Species

The following section discusses the potential impacts to those Federally listed threatened or endangered species known to occur or potentially occur along the Spring Creek Alternatives.

4.5.6.3.1 Piping Plover

Spring Creek

Impacts to piping plovers would generally include disturbance to nesting pairs, loss of habitat (particularly nesting), and reductions in water quality that could affect the plovers food supply or ability to forage (Section 4.4.12.2). The only suitable nesting habitat for plovers in the project area is the Cheyenne River as other drainages are of insufficient size for sandbars suitable for nesting. The Spring Creek Segment would have no affect on plover nesting habitat or nesting plovers along the Cheyenne River as it does not cross it and would be a mile or more away. However, because approximately 7.5 miles of this segment would be in the Spring Creek drainage, it could impact water quality in the Cheyenne River downstream of the confluence between the two waterways. Soil disturbance during construction adjacent to Spring Creek and the numerous crossings could increase erosion and sedimentation into the creek, resulting in increased water turbidity. This turbidity would continue for some distance downstream of where Spring Creek enters the Cheyenne River. Plovers using this area for foraging could experience a reduction in invertebrates due to increased sedimentation. These impacts would only be expected during construction of the rail line and would only affect a small portion of the Cheyenne River.

Additionally, spills of petroleum products during construction and operation could affect aquatic invertebrates upon which piping plover feed. However, this impact would only occur if sufficient material is spilled and flows downstream in Spring Creek to the Cheyenne River, reaching it in sufficient concentrations to harm aquatic invertebrates. This impact is not anticipated due to the limited amounts of petroleum products potentially spilled and the distance (approximately two miles at its nearest point) such material would have to travel before entering the Cheyenne River.

Phiney Flat

The Phiney Flat Alternative would not cross the Cheyenne River and only cross Spring Creek once. Because it would generally be located a mile or more from the Cheyenne River, across relatively flat terrain, it would not result in a loss of plover nesting habitat, disturb nesting plovers, or likely contribute to erosion into the river that could affect the plover's food source. Additionally, the terrain makes it unlikely any hazardous materials such as diesel fuel, would reach the Cheyenne River in the unlikely event of a spill or derailment. Only in the unexpected event of a spill or derailment at the single location where this alternative crosses Spring Creek, approximately one mile from the Cheyenne River, would a spill be a concern for piping plovers.

4.5.6.3.2 Interior Least Tern

Interior least terns utilize similar habitats as piping plovers (Section 4.1.8.4 and Appendix K), including in the project area for the Spring Creek Alternatives. Therefore, the potential impacts of the alternatives upon interior least terns would be similar to those discussed in Sections 4.4.12.3 and 4.5.8.1.

4.5.6.3.3 American Burying Beetle

The American burying beetle has not been documented in the vicinity of the Spring Creek Alternatives. However, they could occur in areas of suitable soils. Compaction of soil and earthmoving activities could make soils unsuitable for use by burying beetle or kill beetles already buried, as discussed in Section 4.4.12.5.

Spring Creek - Alternative B

No suitable soils for American burying beetle would be crossed by this alternative.

Spring Creek - Alternative C

Approximately 0.30 mile (approximately 14.5 acres) of suitable soils would be converted to rail line right-of-way by this alternative.

Phiney Flat

The Phiney Flat Alternative would cross approximately 3.6 miles (approximately 174.5 acres) of soils suitable for use by American burying beetles.

4.5.6.3.4 Bald Eagle

Areas along the corridor of the Cheyenne River could be potential bald eagle winter habitat. Impacts to wintering bald eagles would occur from human activity associated with project construction, operation and maintenance, as well as loss of habitat for nesting, perching and roosting (Section 4.4.12.7).

Spring Creek - Alternative B

Approximately 9.7 acres of woodland would be lost from construction of the Spring Creek Segment for Alternative B. Currently, most of this woodland is unsuitable for bald eagle use for roosting, nesting, or perching due to the size of the trees being too small. However, over time, some of the trees in this area could grow to a sufficient size to provide nesting and perching trees. Woodlands are not extensive enough in this area to provide suitable roosting areas as they would not provide shelter from severe winter weather. No bald eagle nests occur along the proposed Spring Creek Segment.

Spring Creek - Alternative C

No woodland would be lost from Alternative C. There is no bald eagle habitat or nests along this alternative.

Phiney Flat

No bald eagle nests exist along the alignment for the Phiney Flat Alternative. Except for a few scattered trees, no potential bald eagle habitat would be crossed by this alternative.

4.5.6.3.5 Mountain Plover

The potential impacts from the Spring Creek Alternatives to mountain plovers would be similar to those types of impacts discussed in Section 4.4.12.8. They would generally include destruction of nests during construction and disturbance to nesting birds leading to nest failure during both rail line construction and operation. Mountain plover nests and chicks would be particularly susceptible to mortality from vehicles and construction equipment, especially along two-track roads and where construction activities would cross prairie dog towns.

Spring Creek - Alternative B

The Spring Creek Segment of Alternative B would convert 8.3 miles (approximately 402.4 acres) of grasslands that are considered potential mountain plover nesting habitat to railroad right-of-way. Additionally, mountain plover appear to prefer prairie dog colonies for nesting because of the short-grass. There are 0.2 mile (approximately 9.7 acres) of prairie dog colonies along this alignment that would be converted to railroad right-of-way. Additional areas of these habitats adjacent to the right-of-way may be unsuitable for nesting due to human activity and noise during construction and operation.

Spring Creek - Alternative C

This alternative would convert approximately 7.7 miles of grasslands (approximately 373.3 acres) that are considered potential nesting habitat to railroad right-of-way. There are 0.4 mile (approximately 19.4 acres) of prairie dog colonies that would be converted to railroad right-of-way. Additional habitat adjacent to the right-of-way may be unsuitable for nesting due to human activity and noise during construction and operation.

Phiney Flat

The Phiney Flat Alternative would convert 4.6 miles of grasslands (approximately 223.0 acres) that are considered potential nesting habitat to railroad right-of-way. There are 0.3 mile (approximately 14.5 acres) of prairie dog colony that would be converted to railroad right-of-way. Additional habitat adjacent to the right-of-way may be unsuitable for nesting due to human activity and noise during construction and operation.

4.5.6.3.6 Swift Fox

Swift fox may occur in a variety of habitats throughout the project area (Section 4.4.12.9 and Appendix K). Swift fox are known to utilize prairie dog colonies, primarily for prey. Therefore the amount of prairie dog colony converted to rail line serves as a means to compare the potential impacts of each alternative.

Spring Creek - Alternative B

This alternative would convert approximately 0.2 mile (approximately 9.7 acres) of prairie dog colonies to rail line right-of-way.

Spring Creek - Alternative C

The Alternative C alignment for the Spring Creek Segment would result in the conversion of approximately 0.4 mile (approximately 19.4 acres) of prairie dog colonies to rail line right-of-way.

Phiney Flat

The Phiney Flat Alternative would convert 0.3 mile (approximately 14.5 acres) of prairie dog colony to rail line right-of-way.

4.5.6.3.7 Sturgeon Chub

Increased sedimentation in the Cheyenne River during construction could impact sturgeon chub. Increased silt in the water from erosion can reduce water quality and be harmful to chubs as well as increasing sedimentation that could reduce chub habitat (Section 4.4.12.10).

Spring Creek

The Spring Creek Segment does not cross the Cheyenne River. However, as discussed for the piping plover in Section 4.5.8.1, erosion into Spring Creek could increase sedimentation and dissolved solids in the Cheyenne River downstream of the confluence of the two streams. Any such impacts would likely be minimal due to the distance from the Cheyenne River (over one mile).

Phiney Flat

The Phiney Flat Alternative only crosses Spring Creek once and is generally more than a mile from either Spring Creek or the Cheyenne River. This distance, combined with the relatively flat terrain of the alignment make it unlikely that any erosion of disturbed areas in the right-of-way would impact nearby surface waters.

4.5.6.3.8 Black-tailed Prairie Dog

Direct impacts to black-tailed prairie dogs are most likely to occur during construction if the animals occur in the right-of-way. Burrows and dens of inhabited colonies and within the construction right-of-way would be destroyed. Some mortality to prarie dogs would also be expected during excavation and other earthmoving activities. During rail line operation, fragmentation of colonies could reduce their ability to sustain themselves as well as result in mortality to individuals crossing the rail line from one area of the colony to the other.

Spring Creek - Alternative B

This alternative would convert approximately 0.2 mile (approximately 9.7 acres) of prairie dog colonies to rail line right-of-way.

Spring Creek - Alternative C

The Alternative C alignment for the Spring Creek Segment would result in the conversion of approximately 0.4 mile (approximately 19.4 acres) of prairie dog colonies to rail line right-of-way.

Phiney Flat

The Phiney Flat Alternative would convert 0.3 mile (approximately 14.5 acres) of prairie dog colony to rail line right-of-way.

4.5.7 TRANSPORTATION

Transportation impacts would be similar to those described in Section 4.4.13. They would include increased vehicle traffic and delays at new grade crossings during construction and vehicle delays due to passing trains during operation. SEA concluded that the potential effect of increased train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and the additional vehicular delay would be minimal. None of the Spring Creek Alternatives have any public highway/railroad grade crossings where ADT volumes are 5,000 or greater. Therefore, SEA did not calculate potential vehicle delay or queue at these new crossings.

Spring Creek

The Spring Creek Segment would have one new grade crossing of a public road. The new crossing would be of County Highway 121 in Custer County.

Phiney Flat

The Phiney Flat Alternative would have six new crossings of public roadways. These crossings would include Creston Folsom Road (C486) in Pennington County and four crossings of Creston Folsom Road (C220) and an unnamed county road in Custer County.

4.5.8 SAFETY

Construction and operation of a rail line has the potential to result in injury or loss of human life, particularly at locations where the rail line would cross an active roadway grade crossing. Vehicles operating across the rail line would be at risk of accidents during construction as well as being struck by a train during rail line operation. Section 4.4.14 provides a detailed discussion of the potential affects of construction and operation of new rail line on safety.

Spring Creek - Alternative C

The Alternative C alignment for the Spring Creek Segment would result in the conversion of approximately 0.4 mile (approximately 19.4 acres) of prairie dog colonies to rail line right-of-way.

Phiney Flat

The Phiney Flat Alternative would convert 0.3 mile (approximately 14.5 acres) of prairie dog colony to rail line right-of-way.

4.5.7 TRANSPORTATION

Transportation impacts would be similar to those described in Section 4.4.13. They would include increased vehicle traffic and delays at new grade crossings during construction and vehicle delays due to passing trains during operation. SEA concluded that the potential effect of increased train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and the additional vehicular delay would be minimal. None of the Spring Creek Alternatives have any public highway/railroad grade crossings where ADT volumes are 5,000 or greater. Therefore, SEA did not calculate potential vehicle delay or queue at these new crossings.

Spring Creek

The Spring Creek Segment would have one new grade crossing of a public road. The new crossing would be of County Highway 121 in Custer County.

Phiney Flat

The Phiney Flat Alternative would have six new crossings of public roadways. These crossings would include Creston Folsom Road (C486) in Pennington County and four crossings of Creston Folsom Road (C220) and an unnamed county road in Custer County.

4.5.8 SAFETY

Construction and operation of a rail line has the potential to result in injury or loss of human life, particularly at locations where the rail line would cross an active roadway grade crossing. Vehicles operating across the rail line would be at risk of accidents during construction as well as being struck by a train during rail line operation. Section 4.4.14 provides a detailed discussion of the potential affects of construction and operation of new rail line on safety.

To further address potential accidents resulting from new grade crossings, SEA calculated accident frequency rates at all proposed public grade crossings. SEA's analysis procedure considered the type of warning devices at the highway/rail grade crossing, including passive devices (signs or crossbucks), flashing lights, or gates. The following presents the results of SEA's analysis for each county, at the various levels of proposed operation.

Spring Creek

Custer County

20 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Spring Creek Alternative at County Highway 121 (Milepost 625.50), the predicted accident frequency at the 20 MNT level of operation is 0.008. This frequency corresponds to 1 accident every 125 years. The proposed crossing in Custer County is classified as Category B (see Section 4.4.14 for a description of categories).

50 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Spring Creek Alternative at County Highway 121 (Milepost 625.50), the predicted accident frequency at the 50 MNT level of operation is 0.011. This frequency corresponds to 1 accident every 91 years. The proposed crossing in Custer County is classified as Category B.

100 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Spring Creek Alternative at County Highway 121 (Milepost 625.50), the predicted accident frequency at the 100 MNT level of operation is 0.015. This frequency corresponds to 1 accident every 67 years. The proposed crossing in Custer County is classified as Category B.

Phiney Flat

Pennington County

20 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Phiney Flat Alternative at County Highway Creston Road/C486 (Milepost 625.20), the predicted accident frequency at the 20 MNT level of operation is 0.015. This frequency corresponds to one accident every 67 years. The proposed crossing in Pennington County is classified as Category B.

50 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Phiney Flat Alternative at County Highway Creston Road/C486 (Milepost 625.20), the predicted accident frequency at the 50 MNT level of operation is 0.021. This frequency corresponds to 1 accident every 48 years. The proposed crossing in Pennington County is classified as Category B.

100 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Phiney Flat Alternative at County Highway Creston Road/C486 (Milepost 625.20), the predicted accident frequency at the 100 MNT level of operation is 0.027, which corresponds to 1 accident every 37 years. The proposed crossing in Pennington County is classified as Category B.

Custer County

20 MNT

SEA's safety analysis showed that for the 5 proposed public highway/railroad grade crossing along the Phiney Flat Alternative, the highest predicted accident frequency at the 20 MNT level of operation is 0.015. This corresponds to 1 accident every 67 years. The predicted rate was calculated for the crossings of Creston Folsom Road/C220 (Milepost 629.10, 630.10, 630.60, and 631.67). The proposed crossings in Custer County are all classified as Category B.

50 MNT

SEA's safety analysis showed that for the 5 proposed public highway/railroad grade crossing along the Phiney Flat Alternative, the highest predicted accident frequency at the 50 MNT level of operation is 0.021. This corresponds to 1 accident every 48 years. The predicted rate was calculated for each crossings of Creston Folsom Road/C220 (Milepost 629.10, 630.10, 630.60, and 631.67). The proposed crossings in Custer County are all classified as Category B.

100 MNT

SEA's safety analysis showed that for the 5 proposed public highway/railroad grade crossing along the Phiney Flat Alternative, the highest predicted accident frequency at the 100 MNT level of operation is 0.027. This corresponds to 1 accident every 37 years. The predicted rate was calculated for crossings of Creston Folsom Road/C220 (Milepost 629.10, 630.10, 630.60, and 631.67). The proposed crossings in Custer County are all classified as Category B.

4.5.9 HAZARDOUS MATERIALS

Section 4.4.15 provides a detailed discussion of the potential project related impacts to hazardous materials transportation and sites. Because no hazardous materials are anticipated to be transported over Alternatives B or C, neither of the Spring Creek Alternatives would have any impact on their transportation. No hazardous waste sites have been identified along either of the alternatives. However, construction of either rail line could impact them if unknown sites are located within the rail line right-of-way. DM&E should coordinate with the EPA and South Dakota Department of Environment and Natural Resources to obtain specific information on the location of know hazardous materials sites. However, due to the undeveloped and remote location of these alignments, no such sites are anticipated to occur along either the Spring Creek Segment or the Phiney Flat Alternative.

4.5.10 ENERGY RESOURCES

Section 4.4.16 provides a detailed discussion of the potential impacts of the new rail line extension on energy resources, both their transportation and utilization, and on recyclable commodities. The Spring Creek Alternatives would contribute to the impacts discussed in this section. The Phiney Flat Alternative would potentially be less fuel efficient due to it being 1.8 miles longer than the Spring Creek Segment. However, grade considerations with both alternatives, resulting in trains operating up- and downhill along these alternatives, would likely make them similar in overall fuel consumption. No recyclable commodities would be transported by either alternative.

50 MNT

SEA's safety analysis showed that for the 5 proposed public highway/railroad grade crossing along the Phiney Flat Alternative, the highest predicted accident frequency at the 50 MNT level of operation is 0.021. This corresponds to 1 accident every 48 years. The predicted rate was calculated for each crossings of Creston Folsom Road/C220 (Milepost 629.10, 630.10, 630.60, and 631.67). The proposed crossings in Custer County are all classified as Category B.

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4.5.11 CULTURAL RESOURCES

Cultural resources occur throughout the project area and could be affected if important archaeological or historic sites are damaged or destroyed, particularly if they could add to the understanding of the area's human occupation. The potential types of impacts that could occur to cultural resources as a result of new rail line construction and operation are discussed in Section 4.4.17.

Construction and operation of the Spring Creek Alternatives have the potential to affect cultural resources by damaging or destroying them or altering the setting in which they occur. However, during construction, cultural materials encountered could be recovered and preserved for future study and research. Only two cultural resource sites are known along the Spring Creek Alternatives. However, each of the alternatives is considered to have a high potential for encountering archaeological sites, including sites of significance and eligible for the NRHP. The lack of known sites along the alternatives is most probably due to the lack of archaeological survey and study in the area due to its remoteness and undeveloped character.

Spring Creek

No known cultural resource sites are located along the Spring Creek Segment of Alternative B. However, this segment is considered to have a high potential for such resources due to its proximity to both the Cheyenne River and Spring Creek. It would have provided a reliable source of water and sheltered valleys that would have been attractive for campsites and hunting areas in prehistoric times.

Phiney Flat

Two known archaeological sites are located outside the proposed rail line right-of-way but within 1.0 mile of the Phiney Flat Alternative. These sites include a Euro-American depression and a Native American stone circle. This segment is considered to have a high potential for such resources due to its proximity to the Cheyenne River. It would have provided a reliable source of water and sheltered valley that would have been attractive for campsites and hunting areas in prehistoric times.

4.5.12 SOCIOECONOMICS

The Spring Creek Alternatives comprise a portion of the construction and operation of new rail line that would occur throughout Pennington and Custer Counties. Because they comprise only a small portion and are only 1.8 miles different in length, the overall difference in

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4.5.13 ENVIRONMENTAL JUSTICE

None of the Spring Creek Alternatives would potentially impact any environmental justice communities.

4.5.14 RECREATION

Impacts to recreation from the Spring Creek Alternatives would be similar in nature for each of the proposed alignments. The type of potential impacts would be similar to those discussed in Section 4.4.20. Generally, these impacts would include disturbance to individuals participating in a variety of recreational activities such as hunting, camping, horseback riding, and hiking. Additional lands adjacent to the right-of-way may also be considered by the public or landowners as undesirable due to trains disturbing horses during riding, game during hunting, and campers trying to sleep. During construction and operation, big game hunting (an important recreational activity in the area) may be particularly affected by noise and human presence. Noise and human activities would both cause game to seek areas undisturbed by these activities and, for safety reasons, require hunters to avoid areas near the rail line. This would further reduce the lands available for recreation.

In addition to noise disturbance, rail line construction and operation may also reduce the attractiveness of an area for recreation due to the alteration of the visual setting of the area. Construction and operation of a rail line would create an intrusion into the landscape considered by some to be unattractive, resulting in individuals changing their recreational patterns to avoid areas within site of the rail line.

Because these alternatives cross mainly private lands, as discussed for each alternative below, and the alternatives pass through remote areas, impacts to recreation would generally occur to a small number of individuals, including landowners, their families, and guests.

Spring Creek - Alternative B

This alternative would cross 2.1 miles of lands that are part of BGNG. For safety reasons, the lands within the right-of-way, approximately 101.8 acres, would be fenced and removed from their anticipated socioeconomic impacts to the counties in which they are located should be minimal. Therefore, the socioeconomic impacts of the Spring Creek Alternatives are included as part of the total socioeconomic impacts anticipated for the project. These impacts are discussed in detail in Section 4.4.16.

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Spring Creek - Alternative B

This alternative would cross 2.1 miles of lands that are part of BGNG. For safety reasons, the lands within the right-of-way, approximately 101.8 acres, would be fenced and removed from public use. The remaining 6.1 miles of this alternative would directly remove approximately 310.3 acres of private land from use for recreation.

Spring Creek - Alternative C

This alternative would cross 0.2 mile of BGNG, removing approximately 9.7 acres of public land from recreational use. Approximately 402.4 acres of private land would be directly converted to rail line right-of-way for the remaining 8.3 miles and removed from potential recreational use.

Phiney Flat

No public lands would be crossed by this alternative. Construction of the 10.3-mile Phiney Flat Alternative would directly remove approximately 499.4 acres from recreational use.

4.5.15 AESTHETICS

Section 4.4.21 provides a detailed discussion of the potential project related impacts to the aesthetics of the project area. As noted in Section 4.4.21, no designated scenic areas or overlooks occur along the project alternatives, although many areas are considered by landowners and visitors as scenic. The same is true for the Spring Creek Alternatives. Additionally, the USFS has developed VQOs for lands under its management in an attempt to quantify the scenic value of its areas (Section 4.4.21). Each of these alternatives would create a visual intrusion into the current landscape, altering the visual quality.

There is also concern that emissions from operating locomotives could contribute to regional haze and impact visibility of nearby Class I airsheds (Badlands National Park/Sage Creek Wilderness Area and Wind Cave). The minimal emissions that would result along the Spring Creek Alternatives due to their short length would not result in any reduction in air quality for these areas. However, as part of the total project, emissions along these alternatives could affect air quality for these areas. Section 4.4.21 discusses the potential air quality impacts to Class I areas and includes the emissions that would result from the Spring Creek Alternatives.

Spring Creek - Alternative B

This alternative would cross 2.1 miles of BGNG that has a VQO of modification. The Spring Creek Segment would be constructed largely within the Spring Creek drainage, a winding drainage between two higher, flat areas that provide a vantage point for the viewer. The creek is a mixture of wooded vegetation and grassland which would require clearing and numerous cuts, fills, and bridges or culverts for the stream crossing. This segment would create an obvious visual intrusion into this area. Although the remoteness of the area would limit the individuals affected by the change, it would likely be considered an undesireable view compared to that currently present by those that would see it.

Spring Creek - Alternative C

This alternative would cross 0.2 mile of BGNG that has a VQO of modification. Because of the proximity of the Spring Creek alignments for Alternatives B and C, other impacts from this alternative on aesthetics would be similar to those discussed for Alternative B.

Phiney Flat

No USFS lands would be crossed by this alternative. The Phiney Flat Alternative would be located across generally flatter terrain, as compared to within a valley for the Spring Creek Segment. While the terrain may allow the rail line to be visible for a greater distance, it would be less noticeable due to the lack of higher vantage points along the alignment. Additionally, the Phiney Flat Alternative has six road crossings (compared to one for Spring Creek Segment) and crosses 5.7 miles of cropland (compared to less than 1.0 mile for Spring Creek Segment). While these uses of the area may increase the individuals that see the rail line, ground disturbance related to agricultural activities and the presence of roadways, linear transportation facilities like a rail line, may cause the rail line to present less of an intrusion into the landscape.

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4.6 HAY CANYON ALTERNATIVES

Three alternative alignments are proposed for the Hay Canyon area. As discussed in Chapter 2, these alternatives were developed due to environmental concerns raised by the USFWS and Reclamation. The original alignments through this area included the Hay Canyon Segment, originally the proposed alignment for use with Alternative C, and the Oral Segment, originally proposed for use with Alternative B. Because of concerns for riparian areas and wetlands by the USFWS, COE, and others along the Hay Canyon Alternative, DM&E developed the WG Divide Alternative alignment. However, this alternative raised concerns with Reclamation because it would cross irrigated lands that are part of the Angostura Irrigation District and could affect operation and maintenance of the Angostura Dam and Reservoir. SEA therefore evaluated the proposed alignments in the Hay Canyon area and determined that use of the Oral Alternative alignment would minimize the amount of irrigated lands impacted and also avoid the Hay Canyon area. SEA determined three feasible alternatives existed in the Hay Canyon area, and that any of the alternatives could be used in conjunction with either Alternative B or C.

The following discussion provides a comparison of the potential impacts of the Hay Canyon Alternatives. Information on the existing conditions along these alternatives is provided in Section 4.1. More detailed discussion of the types, nature, and significance of impacts to the various resources discussed below is included under each resource topic in Section 4.4.

4.6.1 GEOLOGY AND SOILS

Section 4.4.5 discusses the potential impacts to geology and soils that could result from new rail line construction and operation. Impacts would generally be expected to occur during the construction of new rail line and would include creation of unstable areas leading to slope slumps or landslides, clearing and soil disturbance resulting in increased erosion, and loss or damage to paleontological resources.

4.6.1.1 Geologic Hazards

Hay Canyon

This alternative would cross 0.9 mile (approximately 43.6 acres) of soils that have a high slump/landslide potential. The clay-mineral content of these rocks is moderate to high, so that they are susceptible to slumps and earth flows. The potential for slumps or landslides would also be high along the 2.7 miles where this alternative would cross steep slopes.

WG Divide

This alternative would cross 1.2 miles (approximately 58.2 acres) of soils that have a high slump/landslide potential. The potential for slumps or landslides would also be high along 2.8 miles where this alternative would cross steep slopes. Cutting or loading of slopes or unusually high precipitation could also cause landsliding in these formations.

Oral

This alternative would cross 4.3 miles (approximately 208.5 acres) of soils that have a high slump/landslide potential. Approximately 6.9 miles of the Oral Segment would be along steep slopes susceptible to slumps and landslides.

4.6.1.2 Soil Impacts

Hay Canyon

The impacts to soils would be similar to those discussed in Section 4.4.5.3. They include the loss of topsoil, sedimentation, erosion and the possible introduction and establishment of noxious weeds. The Hay Canyon Segment would disturb approximately 897.0 acres of soil over its 18.5-mile length, approximately 4.0 miles (193.9 acres) of which would cross soils with an erosion hazard. This alternative would cross 7.7 miles (approximately 373.3 acres) of prime farmland.

WG Divide

The types of impacts to soil would be similar to the Hay Canyon Segment. Construction of the WG Divide Alternative would disturb approximately 714.4 acres of soil along its 14.7-mile length. Of this length, approximately 7.3 miles (353.9 acres) would include soils with an erosion hazard. This alternative would cross 4.5 miles (approximately 218.2 acres) of prime farmland.

Oral

The 20.5-mile Oral Segment would include 13.3 miles of construction along new rail line right-of-way and 7.2 miles of reconstruction of existing rail line. However, the existing rail line reconstruction would likely involve extensive earthwork to optimize the existing rail line, which is currently unsuitable for movement of unit coal trains. Therefore, lands within the existing right-of-way, as well as additional lands outside the right-of-way would likely be disturbed by construction. Approximately 993.9 acres of soil would be disturbed from construction of the Oral

Segment. It would cross approximately 13.9 miles (673.9 acres) of soils with an erosion hazard. This alternative would cross 7.8 miles (approximately 378.2 acres) of soils classified as prime farmland.

4.6.1.3 Paleontological Resources

Hay Canyon

The Hay Canyon Segment would cross a total of 15.0 miles (approximately 727.3 acres) of formations with a PFYC of 5. Impacts to these areas would be similar to those discussed in Section 4.4.5.4. These include the chance of destruction of important fossils, particularly vertebrate fossils such as dinosaurs and prehistoric mammals.

WG Divide

The WG Divide Alternative would cross 14.5 miles (approximately 703.0 acres) of formations with a PFYC of 5. Impacts would be similar to those discussed in Section 4.4.5.4.

Oral

This alternative would cross 18.3 miles (approximately 887.3 acres) of formations with a PFYC of 5.

4.6.2 LAND USE

Potential project impacts to land use would include conversion of current land use to rail line right-of-way, preclusion of existing land uses within the right-of-way, and incompatibility with adjacent land uses. These impacts and others are discussed in more detail in Section 4.4.6. The following provides an overview of the land use types affected by each of the Hay Canyon Alternatives.

4.6.2.1 Agriculture

4.6.2.1.1 Rangeland/Grazing

Hay Canyon

This segment would cross 14.6 miles (approximately 707.9 acres) of rangeland. Impacts to this resource would be similar to those discussed in Section 4.4.6.1, including the direct loss of forage during construction, fragmentation of allotments, isolation of water sources and disruption of operations. No grazing allotments on Federal lands would be crossed by this alternative.

WG Divide

This alternative would cross approximately 9.0 miles (approximately 436.4 acres) of rangeland. No grazing allotments on Federal lands would be affected by this alternative.

Oral

This alternative would cross 13.9 miles (approximately 673.9 acres) of rangeland. One BLM grazing allotment would be crossed by this alternative resulting in a disturbance of approximately 6.5 acres, equivalent to the loss of 0.8 AUMs.

4.6.2.1.2 Cropland

Hay Canyon

The Hay Canyon Segment would cross 1.8 miles (87.3 acres) of cropland. Portions of this cropland are likely to be irrigated as this segment also crosses 2.6 miles of the Angostura Irrigation District and 7.7 miles of prime farmland soils. Potential impacts to cropland are discussed in Section 4.4.2.

WG Divide

The WG Divide Alternative would cross 6.3 miles (305.5 acres) of cropland. Portions of this cropland are likely to be irrigated as this segment also crosses 5.8 miles of the Angostura Irrigation District and 4.5 miles of prime farmland soils. Potential impacts to cropland are discussed in Section 4.4.2.

Oral

The Oral Segment would cross 4.5 miles (218.2 acres) of cropland. Portions of this cropland are likely to be irrigated as this segment also crosses 1.5 miles of the Angostura Irrigation District and 7.8 miles of prime farmland soils. Potential impacts to cropland are discussed in Section 4.4.2.

4.6.2.2 Residential

No impacts to residential areas are expected for any of these alternatives.

4.6.2.3 Business and Industrial

No impacts to business and industrial areas are expected for any of the alternatives.

4.6.2.4 Mineral and Mining

No impacts to mineral resources are expected for any of these alternatives.

4.6.2.5 Federal Lands

4.6.2.5.1 Forest Service Lands

No impacts to USFS lands are expected for any of these alternatives.

4.6.2.5.2 Bureau of Land Management Lands

Hay Canyon

No BLM lands would be crossed by this alternative.

WG Divide

No BLM lands would be crossed by this alternative.

Oral

This alternative would cross one BLM allotment for approximately 0.3 mile. Approximately 6.5 acres of this allotment would be disturbed.

4.6.2.5.3 Bureau of Reclamation Lands

All three alternatives would impact the Angostura Irrigation District. The area covered by this district is considered to be the Cheyenne River drainage from just above the Angostura Reservoir to the joining of the Cheyenne River with the Missouri River, about 275 miles downstream of the Angostura Dam in central South Dakota. Angostura Reservoir is about 17 miles long, with another 7.6 miles extending along Horsehead Creek, and averages about 0.5-mile wide in the main body and 0.3-mile wide on Horsehead Creek. Total surface area of the reservoir is 4,612 acres at an elevation of 3,187.2 feet (Reclamation 2000).

The Angostura Dam and Reservoir Project was first authorized in 1939, then re-authorized by the Flood Control Act of 1944. The project consists of Angostura Dam, Angostura Reservoir, a main canal and irrigation distribution system, and public lands surrounding the reservoir. Angostura Irrigation District is responsible for the costs associated with project payback, operation and maintenance. Irrigators are assessed a fee for water based on these projected costs and the amount of acres they irrigate. Currently, Angostura Reservoir provides water to the District to irrigate 12,218 acres below the dam on both sides of the Cheyenne River (Reclamation 2000). Water fees for project costs are based on this 12,218 acres of irrigated land.

Impacts from the Hay Canyon Alternatives to Reclamation lands could occur if water distribution structures are crossed by new rail facilities and if irrigated lands are taken out of production, causing the District to reassess the fees paid by irrigators for water. Water fees would likely be increased on a per irrigated acre basis as less lands would be irrigated and repayment, operation, and maintenance costs would not be expected to change significantly. Impacts to water distribution structures would not likely be significant as appropriate design and construction methods could be used to protect them. Thus, the primary impact would be the loss of irrigated lands. Such impacts are discussed in more detail in Section 4.4.6.2 and would include conversion of lands to rail line right-of-way and loss of the ability to irrigate lands adjacent to the rail line.

Hay Canyon

The Hay Canyon Segment would cross 8 irrigated farm units, converting approximately 134.8 acres to rail line right-of-way. Of these, 6 farm units would lose over 5 percent of the land in the unit.

WG Divide

The WG Divide Alternative would cross 14 farm units, converting approximately 232.5 acres to rail line right-of-way. Of these, 10 farm units would lose over 5 percent of the land in the unit.

Oral

The Oral Alternative would cross 2 new farm units, converting approximately 30.0 acres to rail line right-of-way. Both of these farm units would lose over 5 percent of the land in the unit. Additionally, the existing DM&E rail line portion of the Oral Segment passes through six other farm units. These units were established following construction of the existing rail line. It is unlikely they would be affected by reconstruction of the existing DM&E rail line. However, if in order to optimize this section of existing rail line additional right-of-way or realignment of the existing rail line becomes necessary, portions of these farm units could be incorporated into the rail line right-of-way.

4.6.2.5.4 Fish and Wildlife Service Lands

No impacts to USFWS lands are expected for any of the alternatives.

4.6.2.6 Reservation and Treaty Lands

No impacts to Reservations or Treaty Lands are expected for any of the Hay Canyon Alternatives.

4.6.3 WATER RESOURCES

Potential types of impacts to water resources are discussed in detail in Section 4.4.7. Construction and operation of a new rail line could affect water resources by increasing erosion into the water and subsequently reducing water quality, disturbing or altering the stream causing changes in stream hydrology, contaminating water in the event of a spill, and damage to or loss of wetlands.

4.6.3.1 Surface Water Impacts

Hay Canyon

This alternative would cross 7 perennial, including 1 crossing of the Cheyenne River, and 73 intermittent streams. Construction impacts would be limited to the period of construction and reclamation and would occur primarily at the crossing locations. Impacts could likely include increased erosion and sedimentation, increased water temperature and loss of habitat for aquatic and terrestrial species. Section 4.4.7.1 provides a detailed discussion of the potential impacts to surface waters from construction and operation of new rail facilities.

WG Divide

The WG Divide Alternative would cross 2 perennial, including 1 crossing of the Cheyenne River, and 19 intermittent streams. Impacts would be similar to those discussed for Hay Canyon.

Oral

This alternative would cross 7 perennial and 25 intermittent streams (13 new crossings and 12 existing crossings). Of the 7 perennial stream crossings, 6 would be existing crossings along the DM&E rail line. Existing crossings of perennial streams would include 1 crossing of the Cheyenne River and 5 crossings of Sand Creek. Impacts to these streams would be similar to those discussed in Section 4.4.7.1.

4.6.3.2 Wetlands

Hay Canyon

The Hay Canyon Segment would impact 0.4 mile of wetlands, including approximately 8.9 acres of emergent wetlands, 5.4 acres of aquatic bed wetlands, and 3.6 acres of unconsolidated bottom. These wetlands would be lost through conversion to rail line right-of-way. More detailed discussion of the potential impacts to wetlands is provided in Section 4.4.7.2.

WG Divide

The WG Divide Alternative would cross less than 0.1 mile of wetlands, including approximately 3.0 acres of emergent and 0.2 acres of shrub/scrub wetlands. The impacts would be similar to those mentioned above.

Oral

The Oral Alternative would cross less than 0.1 mile (approximately 2.4 acres) of emergent wetlands. The impacts would be similar to those of the Hay Canyon and WG Divide Alternatives.

4.6.4 AIR QUALITY

Construction of any of the Hay Canyon Alternatives has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

SEA calculated the increase in air pollutant emissions that would result from increased rail operations for these alternatives. The air pollutant emission sources from trains include emissions from the locomotives operating along the new rail line. A summary of the potential emission increases are shown in Tables 4.6-1 through 4.6-9. These emissions are in addition to those presented in Tables 4.4-2 to 4.4-10 for the other portions of the Extension Alternatives.

Table 4.6-1
Comparison of Emission Increases to EPA Thresholds for the 20 million net tons/year for Hay Canyon Segment in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	94.21	100	5.88	100	15.81	100	3.98	100	9.89	100	0.0003	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 18.5

Table 4.6-2
Comparison of Emission Increases to EPA Thresholds for the 20 million net tons/year for WG Divide Alternative in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	74.86	100	4.68	100	12.56	100	3.16	100	7.86	100	0.0003	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 14.7

Table 4.6-3
Comparison of Emission Increases to EPA Thresholds for the 20 million net tons/year for Oral Segment in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	**104.40**	100	6.52	100	17.52	100	4.41	100	10.96	100	0.0004	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 20.5

Table 4.6-4
Comparison of Emission Increases to EPA Thresholds for the 50 million net tons/year for Hay Canyon Segment in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	**224.14**	100	14.00	100	37.62	100	9.47	100	23.54	100	0.0008	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 18.5

Table 4.6-5
Comparison of Emission Increases to EPA Thresholds for the 50 million net tons/year for WG Divide Alternative in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	**178.10**	100	11.12	100	29.89	100	7.53	100	18.71	100	0.0006	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 14.7

Table 4.6-6
Comparison of Emission Increases to EPA Thresholds for the 50 million net tons/year for Oral Segment in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	**248.38**	100	15.51	100	41.68	100	10.50	100	26.09	100	0.0009	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 20.5

Table 4.6-7
Comparison of Emission Increases to EPA Thresholds for the 100 million net tons/year for Hay Canyon Segment in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	**437.58**	100	27.33	100	73.44	100	18.50	100	45.96	100	0.002	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 18.5

Table 4.6-8
Comparison of Emission Increases to EPA Thresholds for the 100 million net tons/year for WG Divide Alternative in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/Fall River	**347.70**	100	21.72	100	58.35	100	14.70	100	36.52	100	0.0011	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 14.7

Table 4.6-9
Comparison of Emission Increases to EPA Thresholds for the 100 million net tons/year for Oral Segment in South Dakota

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Custer/ Fall River	**484.89**	100	30.29	100	81.38	100	20.50	100	50.93	100	0.0002	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 20.5

SEA's calculations predicted that NO_X emissions would exceed EPA thresholds at the 20 MNT level for the Oral Segment and for all the alternatives at the 50 and 100 MNT levels of operation. Therefore, SEA reviewed the results of the CALPUFF air dispersion modeling to determine if the new rail traffic would cause emission levels to exceed the NAAQS or PSD Class II increments. These increments are presented in Section 4.4.8. The results of the CALPUFF analysis indicated there would be no exceedence of either the NAAQS or PSD Class II increments (Appendix E).

Additionally, SEA used the CALPUFF model to determine the potential impacts of the Extension Alternatives to the visibility at Class I airsheds. This analysis included emissions that would result from these alternatives. The results of SEA's visibility analysis are presented in Section 4.4.21.

4.6.5 NOISE

The construction and operation of any of the Hay Canyon Alternatives would increase noise levels along the rail line, as discussed in Section 4.4.9. Operation of construction equipment and train traffic meeting the Board's environmental analysis threshold for noise evaluation would occur along the entire alignment. Tables 4.6-10 through 4.6-18 show the communities, within their respective counties, with the number of noise sensitive receptors expected to experience noise levels exceeding 65 dBA L_{dn}. County totals are in bold and include noise sensitive receptors within communities and in rural areas of the county. Noise sensitive receptors within the 65 dBA L_{dn} noise level due to wayside noise, wayside and horn noise, and horn noise only are provided. Tables 4.6-19 through 4.6-27 show the same information but for the number of noise sensitive receptors exceeding 70 dBA L_{dn}.

Table 4.6-10
Hay Canyon Segment
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 8 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Hay Canyon	**1**	**0**	**4**	**5**
Smithwick	0	0	3	3

Table 4.6-11
WG Divide Alternative
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 8 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
WG Divide	**0**	**1**	**2**	**3**

Table 4.6-12
Oral Segment
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 8 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Oral	**0**	**3**	**20**	**23**
Oral	0	3	17	20
Smithwick	0	0	3	3

Table 4.6-13
Hay Canyon Segment
Number of Noise Sensitive Receptors Exceeding 65 dBA for 18 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Hay Canyon	**1**	**2**	**4**	**7**
Smithwick	0	2	1	3

Table 4.6-14
WG Divide Alternative
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 18 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
WG Divide	**0**	**1**	**3**	**4**

Table 4.6-15
Oral Segment
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 18 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Oral	**0**	**5**	**28**	**33**
Oral	0	5	22	27
Smithwick	0	0	3	3

Table 4.6-16
Hay Canyon Segment
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 34 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Hay Canyon	**1**	**3**	**4**	**7**
Smithwick	0	3	0	3

Table 4.6-17
WG Divide Alternative
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 34 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
WG Divide	**1**	**0**	**3**	**4**

Table 4.6-18
Oral Segment
Number of Noise Sensitive Receptors Exceeding 65 dBA L_{dn} for 34 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Oral	**0**	**10**	**22**	**32**
Oral	0	7	20	27
Smithwick	0	3	0	3

Table 4.6-19
Hay Canyon Segment
Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 8 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Hay Canyon	**0**	**0**	**3**	**3**
Smithwick	0	0	3	3

Table 4.6-20
WG Divide Alternative
Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 8 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
WG Divide	**0**	**0**	**1**	**1**

Table 4.6-21
Oral Segment
Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 8 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Oral	**0**	**0**	**10**	**10**
Oral	0	0	7	7
Smithwick	0	0	3	3

Table 4.6-22
Hay Canyon Alternative
Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 18 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Hay Canyon	**1**	**0**	**5**	**6**
Smithwick	0	0	3	3

Table 4.6-23
WG Divide Alternative
Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 18 Trains Per Day

Alternative and Community	Wayside	Wayside/Horn	Horn	Total
WG Divide	**0**	**1**	**2**	**3**

Table 4.6-24 Oral Segment Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 18 Trains Per Day				
Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Oral	**0**	**0**	**18**	**18**
Oral	0	0	15	15
Smithwick	0	0	3	3

Table 4.6-25 Hay Canyon Segment Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 34 Trains Per Day				
Alternative and Community	Wayside	Wayside/Horn	Horn	Total
Hay Canyon	**1**	**2**	**3**	**6**
Smithwick	0	2	1	3

Table 4.6-26 WG Divide Segment Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 34 Trains Per Day				
Alternative and Community	Wayside	Wayside/Horn	Horn	Total
WG Divide	**0**	**1**	**2**	**3**

Table 4.6-27 Oral Segment Number of Noise Sensitive Receptors Exceeding 70 dBA L_{dn} for 34 Trains Per Day				
Alternative and Community	**Wayside**	**Wayside/Horn**	**Horn**	**Total**
Oral	**0**	**6**	**19**	**25**
Oral	0	4	18	22
Smithwick	0	2	1	3

The scattered, rural nature of the project area for these alternatives results in few noise-sensitive receptors being exposed to noise levels of concern. One house is located within 100 feet of the proposed alternatives for Hay Canyon and WG Divide. There are no houses within 100 feet along the Oral Alternative. Even at the 100 MNT level of operation, only 7, 4, and 32 noise sensitive receptors would be exposed to noise levels exceeding 65 dBA L_{dn} and 6, 3, and 25 noise sensitive receptors would be exposed to noise levels exceeding 70 dBA L_{dn} for the Hay Canyon, WG Divide, and Oral Alternatives, respectively. The number of noise sensitive receptors exposed to significant increases in noise levels along the Hay Canyon and WG Divide Alternatives is not considered to be significant by SEA. Along the Oral Segment, a greater number of noise sensitive receptors would be affected, primarily comprised of residences located in the community of Oral along the existing DM&E rail line. While still not considered a significant number of affected structures, SEA recognizes the noise impacts to Oral would be significant as the entire community would be exposed to a significant increase in noise levels.

4.6.6 BIOLOGICAL RESOURCES

4.6.6.1 Vegetation

Impacts to vegetation from the alternatives would be similar to those discussed in Section 4.4.10. They would primarily include the loss of vegetative cover due to construction activities converting the area to rail line right-of-way.

Hay Canyon

The Hay Canyon Segment would cross 11.1 miles (approximately 538.2 acres) of grasslands and 1.8 miles (approximately 87.3 acres) of cropland and pastures.

WG Divide

This alternative would cross 8.5 miles (approximately 412.1 acres) of grasslands and 6.3 miles (approximately 305.5 acres) of cropland and pasture.

Oral

This alternative would cross 12.9 miles (approximately 625.5 acres) of grasslands and 4.5 miles (approximately 218.2 acres) of croplands and pastures.

4.6.6.2 Wildlife

4.6.6.2.1 Big Game

Impacts to big game would be similar to those mentioned previously in Section 4.4.11.1. The only quantifiable impact to big game is the amount of habitat in the species' seasonal ranges converted to rail line right-of-way. Table 4.6-28 lists the number of miles of seasonal ranges crossed by each alternative and the acres converted to rail line right-of-way.

Table 4.6-28
Comparison of Big Game Seasonal Ranges between the Hay Canyon Alternatives

Big Game Species and Seasonal Range Category	Hay Canyon		WG Divide		Oral	
	miles	acres	miles	acres	miles	acres
Pronghorn						
Winter Range	1.5	72.7	2.0	97.0	2.1	101.8
Yearlong Range	None	None	None	None	None	None
Mule Deer/White-tailed Deer						
Winter Range	1.3	63.0	1.4	67.9	1.7	82.4
Yearlong Range	7.2	349.1	14.0	678.9	14.6	707.9

* In South Dakota, lands may be classified as more than one type of seasonal range, therefore the totals for ranges may be greater than the length of the Alternative.

4.6.6.2.2 Game Species

Upland Game Birds

Construction and operation impacts resulting from new rail line to upland game birds are discussed in detail in Section 4.4.11.2. Impacts would include habitat fragmentation and loss and noise disturbance, particularly to mating rituals performed by male sage grouse during the spring mating season. However, impacts to sage grouse are not anticipated as no sagebrush habitat is crossed by these alternatives. Grouse leks identified along the alternatives are therefore likely sharp-tailed grouse leks to which some disturbance may occur. Upland game birds could also be subject to direct mortality during construction and operation of any alternative as discussed in Section 4.4.11.2.

Hay Canyon

There would be 1 grouse lek within 0.25 mile and 3 leks within 2.0 miles of the Hay Canyon Segment. No woodland habitat for wild turkey would be converted to rail line right-of-way. Approximately 538.2 acres of grassland and 87.3 acres of cropland and pasture providing habitat for pheasants would be converted to rail line right-of-way.

WG Divide

The WG Divide Alternative would not be within 0.25 mile of any grouse leks. However, it would be within 2.0 miles of 2 leks. This alternative would not affect any woodlands but would convert approximately 412.1 acres of grassland and 305.5 acres of cropland and pasture to rail line right-of-way.

Oral

The Oral Segment would be within 2.0 miles of 3 grouse leks. It would convert approximately 625.5 acres of grassland and 218.2 acres of cropland and pasture to rail line right-of-way. No woodland would be affected by the Oral Segment.

Waterfowl

Potential impacts to waterfowl from construction and operation of new rail line are discussed in detail in Section 4.4.11.2. Impacts from these alternatives would generally include loss of nests and habitat in grassland areas, loss of wetland habitat for adults and brood rearing, and disturbance.

Hay Canyon

The Hay Canyon Segment would convert 11.1 miles (approximately 538.2 acres) of grassland habitat and 1.8 miles (87.3 acres) of cropland and pasture potentially providing nesting habitat for waterfowl to rail line right-of-way. It would cross 7 perennial streams, including the Cheyenne River, and 73 intermittent streams. The Hay Canyon Segment would also convert 0.4 mile (approximately 17.9 acres) of wetland habitat to rail line right-of-way.

WG Divide

The WG Divide Alternative would convert 8.5 miles (approximately 412.1 acres) of grassland habitat and 6.3 miles (305.5 acres) of cropland and pasture habitat to rail line right-of-way. This land would not longer be expected to provide suitable nesting habitat for waterfowl. Additionally, the WG Divide Alternative would cross 2 perennial streams, including the Cheyenne River, and 19 intermittent streams and would convert approximately 3.2 acres of wetland to rail line right-of-way.

Oral

The Oral Segment would convert approximately 12.9 miles (625.5 acres) of grasslands and 4.5 miles (305.5 acres) of cropland and pasture to rail line right-of-way. It would have only 1 perennial stream crossing along the new right-of-way, and 6 along existing right-of-way. The Oral Alternative would also have 13 new crossings and 12 existing crossings of intermittent streams. The Oral Segment would convert approximately 2.4 acres of emergent wetlands to rail line right-of-way.

<u>Small Game and Furbearers</u>

Potential impacts to small game animals and furbearers from new rail line construction and operation are discussed in Section 4.4.11.2. Those impacts would be similar to the types of impacts expected from any of the Hay Canyon Alternatives. As these species are found in nearly all habitats and are wide ranging, construction of any of these alignments would have the potential to disturb them and reduce their habitat. Each alternative would also likely result in some mortality to these species during operation. However, because the Hay Canyon and Oral Segments generally follow riparian areas, these alternatives would likely affect a larger amount of habitat for furbearers, particularly species such as beaver, muskrat, and mink, than the WG Divide Alternative which crosses primarily upland grasslands and agricultural lands.

4.6.6.2.3 Non-Game Species

Amphibians and Reptiles

The construction and operation impacts to amphibians and reptiles discussed in Section 4.4.11.3 would be similar to those expected for the Hay Canyon Alternatives. Reptiles and amphibians could occur anywhere along the alternatives and their lack of mobility makes them susceptible to mortality during construction and operation of a rail line. Of the three Hay Canyon Alternatives, the Hay Canyon Segment would likely have the greatest affect on reptiles and amphibians due to its location within the Hay Canyon drainage where water would be available. The Oral Segment, located along the sideslope of the Cheyenne River floodplain would be expected to have the next highest impact due to its location along the river. The WG Divide Alternative would be expected to have the least impact of all the alternatives on reptiles and amphibians because it crosses primarily uplands and does not follow a drainage providing a reliable source of water.

Songbirds

The primary impact to songbirds from construction and operation of a new rail line would be loss of habitat as discussed in Section 4.4.11.3. Both ground and tree nesting songbirds occur throughout the project area. However, only the WG Divide Alternative would impact any woody vegetation, approximately 0.2 acre of shrub/scrub wetland. The remainder of this alternative and all of the Hay Canyon and Oral Segments would affect only grasslands, cropland, or pasture serving as potential habitat for ground nesting songbirds (Section 4.6.6).

Shorebirds

Impacts to shorebirds would be similar to those discussed for waterfowl.

Small Mammals

Small mammals would be impacted during construction and operation by loss of habitat and mortality, as discussed in Section 4.4.11.3. Small mammals are expected to occur throughout the project area and along each of the Hay Canyon Alternatives. Because only minor differences in habitat along each alternative (0.2 acre of scrub/shrub along WG Divide Alternative with all remaining habitat along the alternatives being grassland, cropland, and pasture) would occur, no significant differences in the species along each alternative would be expected. Small mammals would be expected to move back into the right-of-way following reestablishment of vegetation and, because of their high reproductive potential, all of the alternatives would be expected to have minimal impacts on small mammal populations.

Raptors

The potential impacts to raptors from the Hay Canyon Alternatives would be similar to those discussed in Section 4.4.11.3. However, no raptor nest would be impacted by any of the alternatives and no woodland habitat potentially providing roosting, nesting, or perching habitat for raptors would be lost. Each alternative would convert foraging lands and potential ground nesting habitat to rail line right-of-way. Raptors could be struck by trains if feeding or foraging along the rail line.

Aquatic and Fisheries

Potential impacts to aquatic and fishery resources include loss of habitat and reduced water quality as discussed in Section 4.4.11.4. No trout streams are crossed by any of the alternatives and none occur within the proposed project area. Impacts would most likely be in limited areas where the alternatives are in close proximity to perennial streams or drainages or at perennial stream crossings.

Hay Canyon

This alternative would cross 7 perennial streams, including 1 crossing of the Cheyenne River, and 73 intermittent streams, the majority of which are in Hay Canyon Creek. Approximately 6.5 miles of the Hay Canyon Segment would be located within the Hay Canyon Creek drainage valley.

WG Divide

This alternative would cross 2 perennial streams, including 1 crossing of the Cheyenne River, and 19 intermittent streams. The WG Divide Alternative would generally not follow any perennial drainage and would be over a mile from the Hay Canyon drainage and Sand Creek.

Oral

This alternative would cross 7 perennial streams, including 1 crossing of the Cheyenne River, and 25 intermittent streams. Of the 7 perennial stream crossings, 6 would be existing crossings along the existing DM&E rail line. Existing crossings would include 1 crossing of the Cheyenne River and 5 crossings of Sand Creek, as well as 12 intermittent stream crossings.

4.6.6.3 Endangered, Threatened, and Sensitive Species

The following section discusses the potential impacts to those Federally listed threatened or endangered species known to occur or potentially occur along the Hay Canyon Alternatives.

4.6.6.3.1 American Burying Beetle

The American burying beetle has not been documented in the vicinity of the Hay Canyon Alternatives. However, it could occur in areas of suitable soils. Compaction of soil and earthmoving activities could make soils unsuitable for use by burying beetle or may kill beetles already buried.

Hay Canyon

Approximately 7.7 miles (373.3 acres) of suitable soils along the Hay Canyon Segment would be converted to rail line right-of-way.

WG Divide

Approximately 4.5 miles (218.2 acres) of suitable soils would be converted to rail line right-of-way by this alternative.

Oral

Approximately 7.8 miles (378.2 acres) of suitable soils would be converted to rail line right-of-way for the Oral Segment.

4.6.6.3.2 Ute Ladies'-tresses Orchid

If populations of Ute Ladies'-tresses orchid occur within the right-of-way of the new rail line, individual plants or the population could be damaged or lost due to clearing, earthmoving, excavation, or other soil-disturbing activities. Adjacent populations could be impacted during operation of the rail line should the rail line right-of-way result in the establishment of noxious or invasive weeds that could out compete the orchid or if hazardous materials reach a population in the event of a spill.

Only one alternative, the Hay Canyon Segment, would cross a site considered to provide potential Ute Ladies'-tresses habitat. One site, Hay Canyon South, would be crossed by this alternative (Appendix K). No other potential sites were identified by SEA along or near any other areas of the Hay Canyon Alternatives.

4.6.6.3.3 Bald Eagle

Riparian corridors near the Hay Canyon Alternatives could be potential bald eagle winter habitat. Impacts to wintering bald eagles would be from human activity associated with project construction, operation and maintenance, as well as from the loss of any habitat for nesting, perching, and roosting. However, no bald eagle nests exist along any of these alternatives. Therefore, the only potential for impacts would be disturbance. As construction would generally not occur during the winter months, the potential for disturbance would be mainly from operating trains following project completion. Because trains would be expected to operate regularly over the rail line, eagles would be expected to either avoid suitable habitat along the rail line or adapt to train activities and continue to use the area.

Hay Canyon

There would be approximately 1.1 miles of potential bald eagle habitat within 0.5 mile of the Hay Canyon Segment, and within 1.0 mile there would be approximately 3.6 miles of potential habitat.

WG Divide

The WG Divide Alternative would have 1.5 miles of potential bald eagle habitat within 0.5 mile of the rail line. It would also have 5.8 miles of potential habitat within 1.0 mile.

Oral

There would be 6.5 miles of potential bald eagle habitat within 0.5 mile of the Oral Segment. Within 1.0 mile there would also be 10.8 miles of potential bald eagle habitat along the Oral Segment.

4.6.6.3.4 Mountain Plover

The potential impacts from the Hay Canyon Alternatives to mountain plovers would be similar to those types of impacts discussed in Section 4.4.12.8. They would generally include destruction of nests during construction and disturbance to nesting birds leading to nest failure during both rail line construction and operation. Mountain plover nests and chicks would be particularly susceptible to mortality from vehicles and construction equipment, especially along two-track roads and where construction activities would cross prairie dog towns.

Hay Canyon

This alternative would convert 11.1 miles of grasslands (approximately 538.2 acres) that are considered potential nesting habitat to railroad right-of-way. Additionally, mountain plover appear to prefer prairie dog colonies for nesting because of the short-grass. There are 0.2 mile (approximately 9.7 acres) of prairie dog colonies along the Hay Canyon Segment that would be converted to railroad right-of-way. Additional habitat outside the right-of-way may be unsuitable for nesting due to human activity and noise during construction and operation.

WG Divide

The WG Divide Alternative would covert 8.5 miles of grasslands (approximately 412.1 acres) that are considered potential mountain plover nesting habitat to railroad right-of-way. Additionally, this alternative would convert 0.5 mile (approximately 24.2 acres) of prairie dog colonies to railroad right-of-way. Additional habitat outside the right-of-way may be unsuitable for nesting due to human activity and noise during construction.

Oral

This alternative would convert 12.9 miles of grasslands (approximately 625.5 acres) that are considered potential nesting habitat to railroad right-of-way. No mapping was completed for prairie dog colonies along this alternative. While it is likely some prairie dog colonies would be crossed by this alternative, it is unknown how much of this habitat would be converted to rail line right-of-way.

4.6.6.3.5 Swift Fox

Swift fox may occur in a variety of habitats throughout the project area (Section 4.4.12.9 and Appendix K). Swift fox are known to utilize prairie dog colonies, primarily for prey. Therefore, the amount of prairie dog colony converted to rail line serves as a means to compare the potential impacts of each alternative.

Hay Canyon

The Hay Canyon Segment would convert 0.2 mile (approximately 9.7 acres) of prairie dog colonies to railroad right-of-way.

WG Divide

This alternative would convert 0.5 mile (approximately 24.2 acres) of prairie dog colonies to railroad right-of-way.

Oral

No mapping of prairie dog colonies was completed for this alternative. While it is likely some prairie dog colonies would be crossed by this alternative, it is unknown how much of this habitat would be converted to rail line right-of-way.

4.6.6.3.6 Sturgeon Chub

Increased sedimentation in the Cheyenne River during construction could impact sturgeon chub. Increased silt in the water from erosion can reduce water quality and be harmful to chubs as well as increasing sedimentation that could reduce chub habitat.

Hay Canyon

The Hay Canyon Segment crosses the Cheyenne River once. Additionally, it has numerous crossings of Hay Canyon Creek just upstream of the Cheyenne River. Disturbance to bottom sediments and increased erosion at the Hay Canyon Creek crossings and along the approximately 6.5-miles of Hay Canyon Segment located within Hay Canyon could result in increased sedimentation and turbidity in the Cheyenne River.

WG Divide

The WG Divide Alternative would have 1 crossing of the Cheyenne River. Approximately 1.0 mile of alternative would be within the Cheyenne River floodplain. The remainder of this alternative would cross upland areas away from the river and perennial drainages.

Oral

The Oral Segment would cross the Cheyenne River once, involving replacement or reconstruction of the existing DM&E rail bridge over the river immediately north of Oral. It would also include replacement or reconstruction of five existing rail bridges across Sand Creek, upstream of the Cheyenne River.

4.6.6.3.7 Black-tailed Prairie Dog

Direct impacts to black-tailed prairie dogs are most likely to occur during construction if the animals occur in the right-of-way. Burrows and dens of inhabited colonies and within the construction right-of-way would be destroyed. Some mortality to individuals would also be expected during excavation and other earthmoving activities. During rail line operation, fragmentation of colonies could reduce their ability to sustain themselves as well as result in mortality to individuals crossing the rail line from one area of the colony to the other.

Hay Canyon

The Hay Canyon Segment would convert 0.2 mile (approximately 9.7 acres) of prairie dog colonies to railroad right-of-way.

WG Divide

This alternative would convert 0.5 mile (approximately 24.2 acres) of prairie dog colonies to railroad right-of-way.

Oral

No mapping of prairie dog colonies was completed for this alternative. While it is likely some prairie dog colonies would be crossed by this alternative, it is unknown how much of this habitat would be converted to rail line right-of-way.

4.6.7 TRANSPORTATION

Transportation impacts would be similar to those described in Section 4.4.13. They would include increased vehicle traffic and delay at new grade crossings during construction and vehicle delays due to passing trains during operation. SEA concluded that the potential effect of increased train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and the additional vehicular delay would be minimal. None of the Hay Canyon

Alternatives would cross any roadways where the ADT would be 5,000 or greater. Therefore, SEA did not calculate potential vehicle delay or queue at these proposed new crossings.

Hay Canyon

The Hay Canyon Segment would have five new grade crossings of public roads, four in Custer and one in Fall River Counties.

WG Divide

The WG Divide Alternative would have 15 new grade crossings of public roads in Custer (4 crossings) and Fall River (11 crossings) Counties.

Oral

The Oral Segment would have four new grade crossings of public roads, including three crossings in Custer County and one crossing in Fall River County.

4.6.8 SAFETY

Construction and operation of a rail line has the potential to result in injury or loss of life, particularly at locations where the rail line would cross an active roadway grade. Vehicles operating across the rail line would be at risk for accidents during construction as well as being struck by a train during rail line operation. Section 4.4.14 provides a detailed discussion of the potential affects of construction and operation of new rail line on safety.

To further address potential accidents resulting from new grade crossings, SEA calculated accident frequency rates at all proposed public grade crossings. At existing crossings (such as some of those along the Oral Segment), SEA looked at the most recent five years of accident history available and calculated the potential change in the number of years between accidents. SEA's analysis procedure considered the type of existing warning devices at the highway/rail grade crossing, including passive devices (signs or crossbucks), flashing lights, or gates. The following presents the results of SEA's analysis for each county, at the various levels of proposed operation.

Hay Canyon

Custer County

20 MNT

SEA's safety analysis showed that for the four proposed public highway/railroad grade crossings along the Hay Canyon Segment, the highest predicted accident frequency at the 20 MNT level of operation is 0.008. This corresponds to 1 accident every 125 years. The predicted rate occurred at crossings 148th Avenue (Milepost 661.80), 268th Street (Milepost 662.10), County Highway 656 (Milepost 663.90) and County Highway County Line Road (Milepost 666.00). The proposed crossings in Custer County are all classified as Category B (see Section 4.4.14 for description of categories).

50 MNT

SEA's safety analysis showed that for the 4 proposed public highway/railroad grade crossings along the Hay Canyon Segment, the highest predicted accident frequency at the 50 MNT level of operation is 0.011. This corresponds to 1 accident every 91 years. The predicted rate occurred at crossings 148th Avenue (Milepost 661.80), 268th Street (Milepost 662.10), County Highway 656 (Milepost 663.90) and County Highway County Line Road (Milepost 666.00). The proposed crossings in Custer County are all classified as Category B.

100 MNT

SEA's safety analysis showed that for the 4 proposed public highway/railroad grade crossings along the Hay Canyon Segment, the highest predicted accident frequency at the 100 MNT level of operation is 0.015. This corresponds to 1 accident every 67 years. The predicted rate occurred at crossings 148th Avenue (Milepost 661.80), 268th Street (Milepost 662.10), County Highway 656 (Milepost 663.90) and County Highway County Line Road (Milepost 666.00). The proposed crossings in Custer County are all classified as Category B.

Fall River County

20 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Hay Canyon Segment at County Highway 2C (Milepost 670.90), the predicted accident frequency at the 20 MNT level of operation is 0.008, which corresponds to 1 accident every 125 years. The proposed crossing in Fall River County is classified as Category B.

50 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Hay Canyon Segment at County Highway 2C (Milepost 670.90), the predicted accident frequency at the 50 MNT level of operation is 0.011, which corresponds to 1 accident every 91 years. The proposed crossing in Fall River County is classified as Category B.

100 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Hay Canyon Segment at County Highway 2C (Milepost 670.90), the predicted accident frequency at the 100 MNT level of operation is 0.015, which corresponds to 1 accident every 67 years. The proposed crossing in Fall River County is classified as Category B.

W G Divide

Custer County

20 MNT

SEA's safety analysis showed that for the 4 proposed public highway/railroad grade crossings along the WG Divide Alternative, the highest predicted accident frequency at the 20 MNT level of operation is 0.008. This corresponds to 1 accident every 125 years. The predicted rate occurred at the County Highway (Milepost 654.36), County Highway (Milepost 662.50), County Highway 656 (Milepost 662.80) and County Road (Milepost 664.70) crossings. The proposed crossings in Custer County are all classified as Category B.

50 MNT

SEA's safety analysis showed that for the 4 proposed public highway/railroad grade crossings along the WG Divide Alternative, the highest predicted accident frequency at the 50 MNT level of operation is 0.011. This corresponds to 1 accident every 91 years. The predicted rate occurred at the County Highway (Milepost 654.36), County Highway (Milepost 662.50), County Highway 656 (Milepost 662.80) and County Road (Milepost 664.70) crossings. The proposed crossings in Custer County are all classified as Category B.

100 MNT

SEA's safety analysis showed that for the 4 proposed public highway/railroad grade crossings along the WG Divide Alternative, the highest predicted accident frequency at the 100 MNT level of operation is 0.015. This corresponds to 1 accident every 67 years. The predicted rate occurred at the County Highway (Milepost 654.36), County Highway (Milepost 662.50), County Highway 656 (Milepost 662.80) and County Road (Milepost 664.70) crossings. The proposed crossings in Custer County are all classified as Category B.

Fall River County

20 MNT

SEA's safety analysis showed that for the 11 proposed public highway/railroad grade crossings along the WG Divide Alternative, the highest predicted accident frequency at the 20 MNT level of operation is 0.013. This corresponds to 1 accident every 77 years. The predicted rate occurred at the County Road 2G (Milepost 667.40), County Road 2B (Milepost 669.60, 669.80, and 671.20), County Road 2A (Milepost 672.20), County Road 2D (Milepost 673.30), County Road 2E (Milepost 675.30), County Road (Milepost 676.30) and County Road 2F (Milepost 678.50) crossings. The proposed crossings in Fall River County are all classified as Category B.

50 MNT

SEA's safety analysis showed that for the 11 proposed public highway/railroad grade crossings along the WG Divide Alternative, the highest predicted accident frequency at the 50 MNT level of operation is 0.018. This corresponds to 1 accident every 56 years. The predicted rate occurred at the County Road 2G (Milepost 667.40), County Road 2B (Milepost 669.60, 669.80, and 671.20), County Road 2A (Milepost 672.20), County Road 2D (Milepost 673.30), County Road 2E (Milepost 675.30), County Road (Milepost 676.30) and County Road 2F (Milepost 678.50) crossings. The proposed crossings in Fall River County are all classified as Category B.

100 MNT

SEA's safety analysis showed that for the 11 proposed public highway/railroad grade crossings along the WG Divide Alternative, the highest predicted accident frequency at the 100 MNT level of operation is 0.024. This corresponds to one accident every 42 years. The predicted rate occurred at the County Road 2G (Milepost 667.40), County Road 2B (Milepost

669.60, 669.80, and 671.20), County Road 2A (Milepost 672.20), County Road 2D (Milepost 673.30), County Road 2E (Milepost 675.30), County Road (Milepost 676.30) and County Road 2F (Milepost 678.50) crossings. The proposed crossings in Fall River County are all classified as Category B.

Oral Segment

Custer County

20 MNT

SEA's safety analysis showed that for the 3 proposed public highway/railroad grade crossings along the Oral Segment, the highest predicted accident frequency at the 20 MNT level of operation is 0.008. This corresponds to 1 accident every 125 years. The predicted rate occurred at the County Highway (Milepost 661.80), County Highway (Milepost 662.10) and County Highway 656 (Milepost 663.90) crossings. The proposed crossings in Custer County are all classified as Category B.

50 MNT

SEA's safety analysis showed that for the 3 proposed public highway/railroad grade crossings along the Oral Segment, the highest predicted accident frequency at the 50 MNT level of operation is 0.011. This corresponds to 1 accident every 91 years. The predicted rate occurred at the County Highway (Milepost 661.80), County Highway (Milepost 662.10), County Highway 656 (Milepost 663.90) crossings. The proposed crossings in Custer County are all classified as Category B.

100 MNT

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Fall River County

20 MNT

SEA's safety analysis showed that for the proposed public highway/railroad grade crossing along the Oral Segment at County Highway 2C (Milepost 670.90), the predicted accident frequency at the 20 MNT level of operation is 0.008, which corresponds to 1 accident every 125 years. The proposed crossing in Fall River County is classified as Category B.

50 MNT

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100 MNT

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4.6.9 HAZARDOUS MATERIALS

Section 4.4.15 provides a detailed discussion of the potential project related impacts to hazardous materials' transportation and sites. Because no hazardous materials are anticipated to be transported over Alternatives B, C, or D, none of the Hay Canyon Alternatives would have any impact on the transportation of this type of material. No hazardous waste sites have been identified along any of the alternatives. However, construction of any of them could impact unknown sites if they are located within the rail line right-of-way. DM&E should coordinate with the EPA and South Dakota Department of Environment and Natural Resources to obtain specific information on the location of known hazardous materials sites. However, due to the undeveloped and remote locations of the alternative, no such sites are anticipated to occur along the Hay Canyon Segment or WG Divide Alternative. No such sites are anticipated along the Oral Segment. However, because this segment utilizes existing rail line for much of its length and passes through the community of Oral, there would seem to be a greater possibility of hazardous material sites occurring along this alternative than the others.

4.6.10 ENERGY RESOURCES

Section 4.4.16 provides a detailed discussion of the potential impacts of the new rail line extension on energy resources, both their transportation and utilization, and on recyclable commodities. The Hay Canyon Alternatives vary in length from 14.7 to 20.5 miles, with the Oral Segment being the longest and the WG Divide Alternative being the shortest. Differences in length between the alternatives may make the shorter alternatives more fuel efficient than the longer alternatives. However, the grade consideration on the Hay Canyon Segment and WG Divide Alternative may counter any reduction in length, causing fuel consumption to be similar for each of the alternatives. No recyclable commodities would be transported by any of the proposed alternatives.

4.6.11 CULTURAL RESOURCES

Cultural resources occur throughout the project area and could be affected if important archaeological or historic sites are damaged or destroyed, particularly if they could add to the understanding of the area's human occupation. The potential types of impacts that could occur to cultural resources as a result of new rail line construction and operation are discussed in Section 4.4.17.

Construction and operation of the Hay Canyon Alternative have the potential to affect cultural resources by damaging or destroying them or altering the setting in which they occur. However, during construction, cultural materials encountered could be recovered and preserved for future study and research. Archaeologically, only one site is known along the Hay Canyon Alternatives. This site is actually a paleontological site containing bones of modern animals. However, each of the alternative alignments is considered to have a high potential for encountering archaeological sites, including sites of significance and eligible for the NRHP. The lack of known sites along the alternatives is most probably due to the lack of archaeological survey and study in the area due to its remoteness and undeveloped character.

Hay Canyon

The Hay Canyon Segment would be expected to have a high potential for encountering archaeological sites along the 6.5 miles of the segment that follow the Hay Canyon Creek drainage, at the Cheyenne River crossing, and those areas of the alignment north of the river. This is due to the Cheyenne River and Hay Canyon Creek providing a source of water that would have been attractive for campsites and hunting areas in prehistoric times.

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WG Divide

The WG Divide Alternative would have a high potential of encountering archaeological resources along 3.7 miles of its northern-most section, north of its crossing of the Cheyenne River. Once across the river, the WG Divide Alternative would cross mainly upland areas away from reliable sources of water, reducing the potential for cultural resources.

Oral

The Oral Segment would be expected to have a high potential for encountering archaeological sites along the 13.3 miles of the alignment that include new right-of-way. This new right-of-way generally would follow the Cheyenne River corridor which contains numerous archaeological sites, as evidenced by the number of sites indicated for Alternatives B and C in Section 4.4.17. The reliable source of water provided by the Cheyenne River would have made this area attractive for campsites and hunting areas in prehistoric times. The remaining 7.2 miles of the Oral Segment would involve reconstruction of the existing DM&E rail line. While it is likely much of the cultural material present within the right-of-way was destroyed during initial rail line construction, undisturbed areas containing cultural material could still be present. Additionally, it is likely that the existing rail line would require some realignment onto new areas outside the existing right-of-way. Cultural materials in these areas would be susceptible to damage or destruction during construction. While the areas along the existing rail line are considered less likely to contain cultural resources, construction along this portion of the Oral Segment could encounter cultural resources.

The existing DM&E rail line portion of the Oral Segment was constructed nearly 100 years ago. Therefore, many of the structures associated with the existing rail line may meet the criteria of eligibility for the NRHP. SEA reviewed available information on these structures and determined that 12 bridges and culverts occur along the existing rail line portion of the Oral Segment. These include 4 pile bent bridges (none of which are eligible for the NRHP), 4 deck plate girder bridges (all of which are eligible for the NRHP), 1 through plate girder bridge (eligible for the NRHP), 1 through truss bridge (eligible for the NRHP), and 2 stone box culverts (both eligible for the NRHP).

4.6.12 SOCIOECONOMIC

The Hay Canyon Alternatives comprise a portion of the construction and operation of new rail line that would occur throughout Custer and Fall River Counties. Because they comprise only a small portion and are within 6.0 miles of each other in total length, the overall difference in their anticipated socioeconomic impacts to the counties in which they are located should be minimal.

Therefore, the socioeconomic impacts of the Hay Canyon Alternatives are included as part of the total socioeconomic impacts anticipated for the project. These impacts are discussed in detail in Section 4.4.16.

4.6.13 ENVIRONMENTAL JUSTICE

None of the Hay Canyon Alternatives would potentially impact any environmental justice communities.

4.6.14 RECREATION

Impacts to recreation from the Hay Canyon Alternatives would be similar in nature for each of the proposed alignments. The type of potential impacts would be similar to those discussed in Section 4.4.20. Generally, these impacts would include disturbance to individuals participating in a variety of recreational activities such as hunting, camping, horseback riding, and hiking. Additional lands adjacent to the right-of-way may also be considered by the public or landowners as undesirable due to trains disturbing horses during riding, game during hunting, and campers trying to sleep. During construction and operation, big game hunting (an important recreational activity in the area) may be particularly affected by noise and human presence. Noise and human presence would both cause game to seek areas undisturbed by these activities and, for safety reasons, require hunters to avoid areas near the rail line. This would further reduce the lands available for recreation.

In addition to noise disturbance, rail line construction and operation may also reduce the attractiveness of an area for recreation due to the alteration of the visual setting of the area. Construction and operation of a rail line would create an unnatural intrusion into the landscape considered by some to be unattractive, resulting in individuals changing their recreational patterns to avoid areas within site of the line.

All of these alternatives cross private lands. Public Federal and state lands would not be crossed by any of the alternatives. The alternatives would also be located in remote areas. Any recreational use of the areas along these alternatives would primarily be by the landowners, their families, and guests, reducing the number of individuals affected by the project. However, it is likely the remoteness and solitude these areas make them attractive to the individuals that engage in recreational activities in these areas.

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4.6.15 AESTHETICS

Section 4.4.21 provides a detailed discussion of the potential project related impacts to the aesthetics of the project area. As noted in Section 4.4.21, no designated scenic areas or overlooks occur along the project alternatives, although many areas are considered by landowners and visitors as scenic. The same is true for the Hay Canyon area and alternatives.

There is also concern that emissions from operating locomotives could contribute to regional haze and impact visibility of nearby Class I airsheds (Badlands National Park/Sage Creek Wilderness Area and Wind Cave). The minimal emissions that would result along the Hay Canyon Alternatives due to their short length would not result in any reductions in air quality for these areas. However, as part of the total project, emissions along these alternatives could contribute to air quality affects for these areas. Section 4.4.21 discusses SEA's air quality analysis and presents its determinations concerning the potential air quality impacts to these Class I areas. This analysis includes the emissions that would result from the Hay Canyon Alternatives.

Hay Canyon

The Hay Canyon Segment would be constructed largely within the Hay Canyon drainage, a winding drainage through a topographically diverse area with steep and rolling hills. A viewer could obtain a vantage point to see the rail line from any of the numerous high points adjacent to the rail line. However, because of the hills and drainages in the area, construction of 18.5 miles of new rail for this segment would likely require numerous cuts, fills, and bridges or culverts for the stream crossing. This segment would create an obvious visual intrusion into this area, however, the topography of the area would likely limit the length of rail line visible from any one vantage point. The ruggedness, remoteness, and lack of roads in the area would limit the individuals potentially having access to the area to view the visual change. However, the change would likely be considered an undesirable view compared to that currently present by those that would see it.

WG Divide

The WG Divide Alternative would cross generally flatter, more open terrain, preventing hills and drainages from screening the rail line from view. However, such screening would occur throughout the alignment, depending on the location and vantage point of the viewer. The numerous grade crossings (15) would also provide opportunities for larger numbers of people to pass within view of the rail line and reduce the amount of scenery viewed by travelers that would be free of a rail line. However, the additional roads along the WG Divide Alternative provide other linear transportation corridors within the landscape. While such roadways tend to blend to the landscape, a rail line would generally be considered a compatible linear facility and not contrast visually with the visual character created by these other facilities. Additionally, while the 14.7 miles of new rail line would be new to this area, encountering rail lines would not be considered an uncommon occurrence by travelers in the rural United States.

Oral

The Oral Segment would consist of rail construction along approximately 13.3 miles of new rail line right-of-way, the majority of which would be within the Cheyenne River floodplain or on the floodplain sideslopes. These portions of the rail line would be visible to individuals standing at the top of the floodplain sideslope overlooking the river, particularly to those on the opposite side of the river. However, the location of the rail line at the base of the sideslope, below the elevation of the adjacent areas would screen it from the view of individuals away from the river valley. The few roads along the new construction portion of the Oral Segment would reduce access to the area, limiting the number of individuals frequenting the area and capable of seeing the rail line.

The remaining 7.2-miles of the Oral Segment would include the reconstruction of the existing DM&E rail line. While reconstruction of this portion of rail line could involve substantial construction and require realignment of the existing rail line onto areas not currently rail line right-of-way, the new rail line would not present a visual change dramatically different from that currently present in the area due to the existing rail line.

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4.7 BLACK THUNDER MINE LOOP ALTERNATIVES

As discussed in Chapter 2, two alternative routes have been proposed for use with either Alternative B, C, or D to access the Black Thunder mines. The following discussion provides a comparison of the potential impacts of these alternatives. In general, the types of impacts that would result from the Black Thunder Mine Loop Alternatives would be similar to those discussed in Section 4.4. Additionally, the impacts that would result from these alternatives would generally be the same for either Alternative B, C, or D. Information of the existing environment along these alternative alignments is provided in Section 4.1. More detailed discussion of the types, nature, and significance of impacts to the various resources discussed is included under each resource topic in Section 4.4.

4.7.1 GEOLOGY AND SOILS

Section 4.4.5 discusses the potential impacts to geology and soils that could result from new rail line construction and operation. Impacts would generally be expected to occur during the construction of new rail line and would include the creation of unstable areas leading to slope slumps or landslides, clearing and soil disturbance resulting in increased erosion, and loss or damage to paleontological resources.

4.7.1.1 Geologic Hazards

Black Thunder South Mine Loop

This alternative would cross 7.1 miles (approximately 344.2 acres) of potentially hazardous geologic formations, including approximately 3.9 miles of Fort Union Lebo and approximately 3.2 miles of the Wasatch Formations. The clay-mineral content of these rocks is moderate to high, so that they are susceptible to slumps and earth flows. The potential for slumps or landslides would be high along approximately 7.1 miles (344.2 acres) where this alternative would cross steep slopes.

Black Thunder North Loop

This alternative would cross 4.5 miles (approximately 218.2 acres) of potentially hazardous geologic formations, including approximately 3.6 miles of Fort Union Lebo and approximately 0.9 mile of the Wasatch Formations. The potential for slumps or landslides would be high where this alternative would cross steep slopes or where cutting or loading of slopes or unusually high precipitation may cause landsliding in these formations. This alternative would be approximately 2.6 miles shorter than the Black Thunder South Mine Loop. The potential for slumps or landslides would be high along approximately 4.5 miles (218.2 acres) where this alternative would cross steep slopes.

4.7.1.2 Soil Impacts

Black Thunder South Mine Loop

The impacts to soil would be similar to the other portions of the Extension Alternatives which include the loss of topsoil, erosion, and the possibility of the introduction and establishment of noxious weeds. The Black Thunder South Mine Loop would disturb approximately 344.2 acres of soil over its 7.1-mile length. This alternative would cross 7.1 miles (344.2 acres) of soils with an erosion hazard. Construction on steep soils typically requires larger disturbed areas and longer cut and fill slopes to achieve design grades. Therefore, disturbance of soils in these areas could increase the potential for erosion. This alternative is 2.6 miles longer than the Black Thunder North Mine Loop. Its additional length would cause more total soil disturbance and could cause more potential erosion than the North loop. No prime farmland would be impacted by this alternative.

Black Thunder North Mine Loop

The impacts to soil would be similar to the other alternative. The Black Thunder North Mine Loop would disturb approximately 218.2 acres of Group 7 soil over its 4.5-mile length, all of which presents an erosion hazard. No prime farmland would be impacted by this alternative.

4.7.1.3 Paleontological Resources

Impacts to paleontological resources would occur if important fossils are damaged or destroyed during project construction. A description of paleontological resources located in this region and potential impacts are presented in Sections 4.2.3.5 and 4.4.5.3.1, respectively.

Black Thunder South Mine Loop

This alternative would cross approximately 3.9 miles of PFYC 3 soils and 3.2 miles of PFYC 5 soils.

Black Thunder North Mine Loop

This alternative would cross approximately 3.6 miles of PFYC 3 soils and 0.9 mile of PFYC 5 soils.

4.7.2 LAND USE

Potential project impacts to land use would include conversion of current land use to rail line right-of-way, preclusion of existing land uses within the right-of-way, and incompatibility with adjacent land uses. These impacts and others are discussed in more detail in Section 4.4.6. The following provides an overview of the land use types affected by each of the Mine Loop Alternatives.

4.7.2.1 Agriculture

Black Thunder South Mine Loop

This alternative would cross 5.8 miles (approximately 281.2 acres) of rangeland. Impacts to this resource would be similar to those discussed in Section 4.4.6.1 including the direct loss of forage during construction, fragmentation of allotments, isolation of water sources, and disruption of operations. This alternative would cross 3 pastures in 2 Federal grazing allotments. This would result in a loss of approximately 45.1 AUM's in these allotments.

Black Thunder North Mine Loop

This alternative would cross 3.8 miles (approximately 184.2 acres) of rangeland. Impacts to this resource would be similar to those mentioned above. This alternative would cross 5 pastures in 3 Federal grazing allotments resulting in the loss of approximately 2 AUM's.

4.7.2.2 Residential

No impacts to residential areas are expected for any of these alternatives.

4.7.2.3 Mineral and Mining

Black Thunder South Mine Loop

This alternative would cross 1.0 mile (approximately 48.5 acres) of strip mines, quarries, and gravel pits. It would also cross approximately 2.0 miles of reclaimed areas. Additional access would be provided to the Black Thunder Mine. It would also cross approximately 0.3 mile (14.5 acres) of industrial land.

<u>Black Thunder North Mine Loop</u>

This alternative would cross 0.6 mile (approximately 29.1 acres) of strip mines, quarries, and gravel pits. It would also cross approximately 2.4 miles of reclaimed areas. Additional access would be provided to the Black Thunder Mine. It would also cross approximately 0.1 mile (4.8 acres) of industrial land. This alternative could conflict with development plans of the Black Thunder Mine for their Thunder Cloud lease located on the north side of State Highway 450.

4.7.2.4 Federal Lands

4.7.2.4.1 Forest Service Lands

<u>Black Thunder South Mine Loop</u>

This alternative would cross 3.1 miles (approximately 150.3 acres) of USFS lands within TBNG. Impacts to these lands would include noise from railroad construction and operation and the visual intrusion of a new rail line, rail bed, and right-of-way. Recreational use of the area adjacent to the proposed mine loop may be reduced due to the reduction of game and increased disturbance in this area.

<u>Black Thunder North Mine Loop</u>

This alternative would cross 0.6 mile (approximately 29.1 acres) of USFS lands within TBNG. Impacts would be similar to those presented above.

4.7.2.4.2 Bureau of Land Management Lands

No impacts to BLM lands are expected from either of the alternatives.

4.7.2.4.3 Bureau of Reclamation Lands

No impacts to Reclamation lands are expected from either of the alternatives.

4.7.2.4.4 Fish and Wildlife Service Lands

No impacts to USFWS lands are expected from either of the alternatives.

4.7.2.5 Reservation and Treaty Lands

No impacts to these lands are expected from either of the alternatives.

4.7.2.6 State of Wyoming Lands

Black Thunder South Mine Loop

This alternative would cross 0.7 mile (approximately 33.9 acres) of State of Wyoming land.

Black Thunder North Mine Loop

This alternative would cross 2.7 miles (approximately 130.9 acres) of State of Wyoming land.

4.7.3 WATER RESOURCES

4.7.3.1 Surface Water Impacts

Potential types of impacts to water resources are discussed in detail in Section 4.4.7. Construction and operation of a new rail line could affect water resources by increasing erosion into the water and subsequently reducing water quality, disturbing or altering the stream causing changes in stream hydrology, contaminating water in the event of a spill, and damage to or loss of wetlands.

Black Thunder South Mine Loop

This alternative would cross 12 intermittent streams.

Black Thunder North Mine Loop

This alternative would cross nine intermittent streams.

4.7.3.2 Wetlands

Black Thunder South Mine Loop

Approximately 0.3 mile (14.5 acres) of wet meadow emergent wetlands would be lost during construction of this alternative. Wetlands located in adjacent areas could be affected by sedimentation and potential changes in surface water flow due to construction of the rail bed.

Black Thunder North Mine Loop

No wetlands would be crossed by this alternative. Impacts may occur to adjacent wetlands as mentioned above.

4.7.4 AIR QUALITY

Construction of either of the Black Thunder Mine Loops has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

The impacts to air quality during operation would be dependent on the length of the alternative selected and the amount of coal from the Black Thunder mines that is actually shipped by DM&E over these mine loops. Since this information will not be determined until operation, the amounts of pollutants cannot be estimated for these track sections. However, in general, the longer mine loop, that being the Black Thunder South Mine Loop, would result in more locomotive emissions than the North Mine Loop.

4.7.5 NOISE

The construction and operation of the Black Thunder Mine Loops would increase noise levels along the rail line, as discussed in Section 4.4.9. Operation of construction equipment and train traffic meeting the Board's environmental analysis threshold for noise evaluation would occur along the entire alignment. No communities would be affected by either of these alternatives. These alternatives would not cause noise disturbance for any noise sensitive receptors. However, noise disturbance would occur for wildlife in the area. Potential impacts due to noise are presented in Section 4.4.11.

4.7.3.2 Wetlands

Black Thunder South Mine Loop

Approximately 0.3 mile (14.5 acres) of wet meadow emergent wetlands would be lost during construction of this alternative. Wetlands located in adjacent areas could be affected by sedimentation and potential changes in surface water flow due to construction of the rail bed.

Black Thunder North Mine Loop

No wetlands would be crossed by this alternative. Impacts may occur to adjacent wetlands as mentioned above.

4.7.4 AIR QUALITY

Construction of either of the Black Thunder Mine Loops has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

The impacts to air quality during operation would be dependent on the length of the alternative selected and the amount of coal from the Black Thunder mines that is actually shipped by DM&E over these mine loops. Since this information will not be determined until operation, the amounts of pollutants cannot be estimated for these track sections. However, in general, the longer mine loop, that being the Black Thunder South Mine Loop, would result in more locomotive emissions than the North Mine Loop.

4.7.5 NOISE

The construction and operation of the Black Thunder Mine Loops would increase noise levels along the rail line, as discussed in Section 4.4.9. Operation of construction equipment and train traffic meeting the Board's environmental analysis threshold for noise evaluation would occur along the entire alignment. No communities would be affected by either of these alternatives. These alternatives would not cause noise disturbance for any noise sensitive receptors. However, noise disturbance would occur for wildlife in the area. Potential impacts due to noise are presented in Section 4.4.11.

4.7.6 BIOLOGICAL RESOURCES

4.7.6.1 Vegetation

Impacts to vegetation from these alternatives would be similar to those discussed in Section 4.4.10. They would primarily include the loss of vegetative cover due to construction activities converting the area to rail line right-of-way.

Black Thunder South Mine Loop

The loss of 6.8 miles (approximately 329.7 acres) of grassland vegetation and 0.3 mile (14.5 acres) of emergent wetland vegetation would occur during construction of this alternative.

Black Thunder North Mine Loop

The loss of 4.5 miles (approximately 218.2 acres) of grassland vegetation would occur during construction of this alternative.

4.7.6.2 Wildlife

4.7.6.2.1 Big Game

Impacts to big game would be similar to those mentioned previously in Section 4.4.11.1. The only quantifiable impact to big game is the amount of habitat in the species' seasonal ranges converted to rail line right-of-way. Table 4.7-1 lists the number of miles of seasonal ranges crossed by each alternative and the acres converted to rail line right-of-way.

Table 4.7-1
Comparison of Wildlife Habitat between the Alternatives

Big Game Species and Seasonal Range Category	Black Thunder South		Black Thunder North	
	miles	acres	miles	acres
Elk				
Winter Range	0	0	0.1	4.8
Yearlong Range	1.9	92.1	1.7	82.4
Pronghorn				
Winter Range	7.1	344.2	4.5	218.2
Yearlong Range	0	0	0	0
Whitetail				
Winter Range	0	0	0	0
Yearlong Range	0	0	0	0
Mule Deer				
Winter Range	0	0	0	0
Yearlong Range	3.7	179.4	2.5	121.2

4.7.6.2.2 Game Species

Upland Game Birds

Construction and operation impacts resulting from new rail line to upland game birds are discussed in detail in Section 4.4.11.2. There are no sage grouse leks within two miles of either Black Thunder Mine Loop.

Waterfowl

Potential impacts to waterfowl from construction and operation of new rail line are discussed in detail in Section 4.4.11.2. Impacts from these alternatives would generally include loss of nests and nesting habitat in grassland areas, loss of wetland habitat for adults and brood rearing, and disturbance.

Black Thunder South Mine Loop

This alternative would convert 5.8 miles (approximately 281.2 acres) of grassland habitat that could provide nesting habitat for waterfowl to rail line right-of-way. It would cross 12 intermittent streams and would convert approximately 14.5 acres of wet meadow emergent wetlands to rail line right-of-way.

Black Thunder North Mine Loop

This alternative would convert 3.8 miles (approximately 184.2 acres) of grassland habitat that could provide nesting habitat for waterfowl to rail line right-of-way. It would cross 9 intermittent streams. No wetlands are located within the proposed right-of-way.

Small Game and Furbearers

Potential impacts from new rail line construction and operation to small game animals and furbearers are discussed in Section 4.4.11.2. Those impacts would be similar to the types of impacts expected from either Black Thunder Mine Loop. As these species are found in nearly all habitats and are wide ranging, construction of either alignment would have the potential to disturb them and reduce their habitat. Both alternatives would also likely result in some mortality to these species during operation. However, because both of the Black Thunder Mine Loops include numerous stream crossings, it would likely affect a larger amount of habitat for furbearer, as these species would tend to utilize the riparian areas along streams.

4.7.6.2.3 Non-Game Species

Amphibians and Reptiles

The construction and operation impacts to amphibians and reptiles discussed in Section 4.4.11.3 would be similar to those expected for the Black Thunder and North Antelope Mine Loop Alternatives. Reptiles and amphibians could occur anywhere along the alternatives and their lack of mobility makes them susceptible to mortality during construction and operation of a rail line. However, the Black Thunder Mine Loops would likely have a greater impact to these species due to its location along the North Prong Little Thunder Creek and many stream crossings, which provide a potential source of water for amphibian habitat and breeding and foraging areas for reptiles.

Songbirds

The primarly impact to songbirds from construction and operation of the proposed alignment alternatives would be the loss of nesting habitat. Songbirds within the project area include both ground and tree nesters. However, no woody vegetation would be affected by either alternative. The Black Thunder Mine Loops would convert approximately 344.2 (South Loop) and 218.2 (North Loop) acres of grassland to rail line right-of-way.

Shorebirds

Impacts to shorebirds would be similar to those discussed for waterfowl. The Black Thunder Segments would have numerous stream crossings and riparian areas.

Small Mammals

Small mammals would be impacted during construction and operation by loss of habitat and mortality, as discussed in Section 4.4.11.3. Small mammals are expected to occur throughout the project area and along both mine loop alternatives. Loss of habitat and any mortality are expected to be similar for both alternatives due to the similar habitats affected. However, because of the high reproductive potential of small mammal species and the limited amount of potential habitat lost, both the alternatives would have similar and generally minimal impacts to small mammal populations.

Raptors

The potential impacts to raptors from the Black Thunder Mine Loops would be similar to those discussed in Section 4.4.11.3. Both alternatives would convert foraging lands and potential ground-nesting habitat to rail line right-of-way. Noise and activity during construction and operation could disturb nesting raptors, resulting in nest abandonment and failure. Table 4.7-2 provides information on raptor nests within proximity to the alternatives. Raptors could be struck by trains if feeding on carrion along the rail line during the winter.

Table 4.7-2
Comparison of Raptor Nesting Sites between the Black Thunder Alternatives

Raptor Types Present along each Alternative	Number of Nests and Distance		
	0.25 Mile	0.5 Mile	1.0 Mile
Black Thunder North			
Ferruginous Hawk	6	10	15
Red-Tail Hawk	1	1	1
Golden Eagle	0	0	1
Black Thunder South			
Ferruginous Hawk	6	8	12
Red-Tail Hawk	0	1	1
Golden Eagle	0	0	5
Great Horned Owl	0	0	1

4.7.6.3 Aquatic and Fisheries

Potential impacts to aquatic and fishery resources include loss of habitat and reduced water quality as discussed in Section 4.4.11.4. No trout streams are crossed by any of the alternatives. Impacts to aquatic and fishery resources would be most likely to occur in areas where the alternatives are in close proximity to streams or drainages or at stream crossings.

4.7.6.4 Endangered, Threatened, and Sensitive Species

The following section discusses the potential impacts to those Federally listed threatened or endangered species known to occur or potentially occurring along the Black Thunder and North Antelope Mine Loop Alternatives.

4.7.6.4.1 Mountain Plover

The potential impacts to mountain plovers would be similar to those types of impacts discussed in Section 4.4.12.8. They would generally include destruction of nests during construction and disturbance to nesting birds leading to nest failure during both rail line construction and operation across grassland areas. The Black Thunder South and North Mine Loop Alternatives would cross approximately 6.8 miles (329.7 acres) and 4.5 miles (218.2 acres), respectively. Mountain plover nests and chicks would be particularly susceptible to mortality from vehicles and construction equipment, especially along 2-track roads and where construction activities would cross prairie dog towns. The nesting habitat for plovers in the project area would include short-grass prairie and black-tailed prairie dog colonies. The Black Thunder Mine Loops do not cross any prairie dog colonies.

4.7.6.4.2 Bald Eagle

Impacts to wintering bald eagles would occur from human activity associated with project construction, operation and maintenance, as well as loss of potential habitat for nesting, perching, and roosting along 0.9 mile of riparian habitat located within 0.5 mile of Little Thunder Creek. No nesting sites are located in proximity to these alternatives.

4.7.6.4.3 Swift Fox

Swift fox may occur in a variety of habitats throughout the project area (Section 4.4.12.9 and Appendix K). Impacts could include loss of habitat and mortality if struck by a train. Swift fox are known to utilize prairie dog colonies, primarily for prey. Therefore the amount of prairie dog colony converted to rail line serves as a means to compare the potential impacts of each alternative. There are no prairie dog colonies located along either Black Thunder Mine Loop.

4.7.7 TRANSPORTATION

Transportation impacts would be similar to those described in Section 4.4.13. They would include increased vehicle traffic and delays at new grade crossings during construction and vehicle delays due to passing trains during operation. SEA concluded that the potential effect of increased train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and the additional vehicular delay would be minimal. Neither Mine Loop Alternative has any public highway/railroad grade crossings where average daily traffic (ADT) volumes are 5,000 or greater. Therefore, SEA did not calculate potential vehicle delay or queue at these new crossings.

<u>Black Thunder South Mine Loop</u>

The Black Thunder Mine Loop would only cross one roadway, State Highway 450 (ADT of 100) in Campbell County.

<u>Black Thunder North Mine Loop</u>

This alternative would not cross any state, county, or grassland roads.

4.7.8 SAFETY

Construction and operation of a rail line has the potential to result in injury or loss of human life, particularly at locations where the rail line would cross an active roadway grade. Vehicles operating across the rail line would be at risk of accidents during construction as well as being struck by a train during rail line operation. Section 4.4.14 provides a detailed discussion of the potential affects of construction and operation of new rail line on safety.

To further address potential accidents resulting from new grade crossings, SEA calculated accident frequency rates at proposed public grade crossings. SEA's analysis procedure considered the type of warning devices at the highway/rail grade crossing, including passive devices (signs and crossbucks), flashing lights, or gates.

SEA evaluated traffic levels at 20 MNT (8 trains), 50 MNT (18 trains), and 100 MNT (34 trains). The amount of rail traffic along each alternative would be dependent on the amount of coal hauled by DM&E from the Black Thunder Mine. The actual level of rail traffic has not yet been determined. As no contracts are currently in place, these evaluation levels are used to provide an assessment of the potential impacts along these mine loop alternatives at various levels of coal transportation from the mines. They do not represent the anticipated rail traffic at the 20 MNT, 50 MNT, and 100 MNT level of total project operation. SEA estimates that the projected levels of traffic from the Black Thunder Mine would not exceed 20 MNT.

Black Thunder South Mine Loop

Campbell County

20 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Highway 450 at the 20 MNT level of operation. The estimated annual accident frequency at the 20 MNT level of operation would range from 0.010 to 0.016. This translates to an increase of 0.007 with an estimated annual accident frequency from 1 accident every 152 years. The proposed crossing would be classified as Catagory B.

50 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Highway 450 at the 50 MNT level of operation. The estimated annual accident frequency would increase from 0.010 to 0.020. This translates into an increase of 0.011

with an accident frequency of 1 accident every 94 years. The proposed crossing would be classified as Catagory B.

100 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Highway 450 at the 100 MNT level of operation. The estimated annual accident frequency would increase from 0.010 to 0.025. This translates into an increase of 0.015 with an accident frequency of 1 accident every 65 years. The proposed crossing would be classified as Catagory B.

Black Thunder North Mine Loop

The Black Thunder North Mine Loop would have no impact as it would have no roadway crossings.

4.7.9 HAZARDOUS MATERIALS

Section 4.4.15 provides a detailed discussion of the potential project related impacts to hazardous materials transportation and sites. Because no hazardous materials are anticipated to be transported over Alternatives B, C, or D, neither the Black Thunder Mine Loop would have any impact on their transportation. No hazardous waste sites have been identified along either of the alternatives. However, construction of either rail line could impact them if unknown sites are located within the rail line right-of-way. DM&E should coordinate with the EPA and Wyoming Department of Environment and Natural Resources to obtain specific information on the location of known hazardous materials sites. However, due to the undeveloped and remote location of these alignments, no such sites are anticipated to occur along either the Black Thunder Mine Loop.

4.7.10 ENERGY RESOURCES

Section 4.4.16 provides a detailed discussion of the potential impacts that would include the effects of the new mine loop alternatives on energy resources, their transportation and utilization. No recyclable commodities would be transported by either alternative.

4.7.11 CULTURAL RESOURCES

Potential impacts to cultural resources located in Wyoming within the proposed project area are presented in Section 4.2.17. The project area has a rich and long history of human

with an accident frequency of 1 accident every 94 years. The proposed crossing would be classified as Catagory B.

100 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Highway 450 at the 100 MNT level of operation. The estimated annual accident frequency would increase from 0.010 to 0.025. This translates into an increase of 0.015 with an accident frequency of 1 accident every 65 years. The proposed crossing would be classified as Catagory B.

Black Thunder North Mine Loop

The Black Thunder North Mine Loop would have no impact as it would have no roadway crossings.

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Black Thunder North Mine Loop

The Black Thunder North Mine Loop would have no impact as it would have no roadway crossings.

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Potential impacts to cultural resources located in Wyoming within the proposed project area are presented in Section 4.2.17. The project area has a rich and long history of human

occupation and known sites of archaeological significance occur throughout the area. Potential impacts could occur to cultural resources as a result of new rail line construction. Inadvertent discovery of archaeological sites may damage or destroy significant sites. No archaeological sites are known along the alternatives. The lack of known sites along the alternatives is most probably due to the lack of archaeological survey and study in the area due to its remoteness and undeveloped character. Any impacts to discovered cultural resource sites associated with new construction would require mitigation in accordance with the PA (Appendix J).

4.7.12 SOCIOECONOMICS

The Black Thunder Mine Loops comprise a portion of the construction and operation of new rail line that would occur throughout Campbell County. Because they comprise only a small portion of the proposed construction within these counties, the overall difference in their anticipated socioeconomic impacts to the counties in which they are located should be minimal. Therefore, the socioeconomic impacts of the Black Thunder Mine Loops are included as part of the total socioeconomic impacts anticipated for the project. These impacts are discussed in detail in Section 4.4.16.

4.7.13 ENVIRONMENTAL JUSTICE

Neither of the Black Thunder Alternatives would potentially impact any environmental justice communities.

4.7.14 RECREATION

Impacts to recreation from the Black Thunder Mine Loops would be similar in nature for each of the proposed alignments. The type of potential impacts would be similar to those discussed in Section 4.4.20. Generally, these impacts would include disturbance to individuals participating in a variety of recreational activities such as hunting, camping, horseback riding, and hiking. Additional lands adjacent to the right-of-way may also be considered by the public or landowners as undesirable due to trains disturbing horses during riding, game during hunting, and campers trying to sleep. During construction and operation, big game hunting (an important recreational activity in the area) may be particularly affected by noise and human presence. Noise and human activities would both cause game to seek areas undisturbed by these activities and, for safety reasons, require hunters to avoid areas near the rail line. This would further reduce lands available for recreation.

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4.7.12 SOCIOECONOMICS

The Black Thunder Mine Loops comprise a portion of the construction and operation of new rail line that would occur throughout Campbell County. Because they comprise only a small portion of the proposed construction within these counties, the overall difference in their anticipated socioeconomic impacts to the counties in which they are located should be minimal. Therefore, the socioeconomic impacts of the Black Thunder Mine Loops are included as part of the total socioeconomic impacts anticipated for the project. These impacts are discussed in detail in Section 4.4.16.

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Impacts to recreation from the Black Thunder Mine Loops would be similar in nature for each of the proposed alignments. The type of potential impacts would be similar to those discussed in Section 4.4.20. Generally, these impacts would include disturbance to individuals participating in a variety of recreational activities such as hunting, camping, horseback riding, and hiking. Additional lands adjacent to the right-of-way may also be considered by the public or landowners as undesirable due to trains disturbing horses during riding, game during hunting, and campers trying to sleep. During construction and operation, big game hunting (an important recreational activity in the area) may be particularly affected by noise and human presence. Noise and human activities would both cause game to seek areas undisturbed by these activities and, for safety reasons, require hunters to avoid areas near the rail line. This would further reduce lands available for recreation.

In addition to noise disturbance, rail line construction and operation may also reduce the attractiveness of recreation areas due to the alteration of the visual setting of the area. Construction and operation of a rail line would create an unnatural intrusion into the landscape considered by some to be unattractive, resulting in individuals changing their recreational patterns to avoid areas within site of the rail line.

Black Thunder South Mine Loop

This alternative would cross 3.1 miles (150.3 acres) on TBNG, 0.7 mile (33.9 acres) of State of Wyoming land, and 3.3 miles (160.0 acres) of private land. For safety reasons, the lands within the right-of-way, approximately 344.2 acres, would be fenced and removed from public use.

Black Thunder North Mine Loop

This alternative would cross 0.6 mile (29.0 acres) of TBNG, 2.7 miles (130.9 acres) of State of Wyoming land, and 1.2 miles (58.2 acres) of private land. Approximately 218.2 acres of land would be directly converted to rail line right-of-way and removed from potential recreational use.

4.7.15 AESTHETICS

Section 4.4.21 provides a detailed discussion of the potential project related impacts to the aesthetics of the project area. As noted in Section 4.4.21, no designated scenic areas or overlooks occur along the project alternatives, although many areas are considered by landowners and visitors as scenic. Additionally, the USFS has developed VQOs for lands under its management in an attempt to quantify the scenic value of its areas (Section 4.4.21). Each of these alternatives would create a visual intrusion into the current landscape, altering the visual quality.

There is also concern that emissions from operating locomotives could contribute to regional haze and impact visibility. The minimal emissions that would result along the Black Thunder Alternatives, due to their short length, would not result in any reduction in air quality for these areas. However, as part of the total project, emissions along these alternatives could affect air quality for these areas.

Black Thunder South Mine Loop

This alternative would cross 2.7 miles of lands with a VQO of modification and 0.4 mile with a VQO of partial retention on TBNG. No areas with a high scenic integrity level (SIL) would be affected.

Black Thunder North Mine Loop

This alternative would cross 0.6 mile of lands with a VQO of modification and less than 0.1 mile with a VQO of partial retention on TBNG. No areas with a high SIL would be affected.

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4.8 NORTH ANTELOPE MINE LOOP ALTERNATIVES

As discussed in Chapter 2, two alternative routes have been proposed for use with either Alternative B, C, or D to access the North Antelope mines. The following discussion provides a comparison of the potential impacts of these alternatives. In general, the types of impacts that would result from the North Antelope Mine Loop Alternatives would be similar to those discussed in Section 4.4. Additionally, the impacts that would result from these alternatives would generally be the same for either Alternative B, C, or D. Information of the existing environment along these alternative alignments is provided in Section 4.1. More detailed discussion of the types, nature, and significance of impacts to the various resources is included under each resource topic in Section 4.4.

4.8.1 GEOLOGY AND SOILS

Section 4.4.5 discusses the potential impacts to geology and soils that could result from new rail line construction and operation. Impacts would generally be expected to occur during the construction of new rail line and would include the creation of unstable areas leading to slope slumps or landslides, clearing and soil disturbance resulting in increased erosion, and loss or damage to paleontological resources.

4.8.1.1 Geologic Hazards

North Antelope East Loop

This alternative would cross 1.5 miles (approximately 72.7 acres) of the Fort Union Lebo Formation. The potential for slumps or landslides would be high where this alternative would cross steep slopes, which are not common to this type of soil. Cutting or loading of slopes or unusually high precipitation may also cause landsliding in these formations.

North Antelope West Loop

This alternative would cross 2.4 miles (approximately 116.4 acres) of the Fort Union Lebo Formation. As with the other alternatives, the potential for slumps or landslides would be high where this alternative would cross steep slopes, which are not common to this type of soil. Cutting or loading of slopes or unusually high precipitation may also cause landsliding in these formations.

4.8.1.2 Soil Impacts

North Antelope East Mine Loop

Impacts to these soils would be similar to those discussed for the other alternatives. The 1.5-mile North Antelope East Mine Loop would disturb approximately 72.7 acres of soils with an erosion hazard. No prime farmland would be impacted by this alternative.

North Antelope West Mine Loop

Impacts to these soils would be similar to those discussed for the other alternatives. The 2.4-mile North Antelope West Mine Loop would disturb approximately 116.4 acres of erodible soils with an erosion hazard. This alternative is 0.9 mile longer than the North Antelope East Mine Loop, which would cause greater soil disturbance. No prime farmland would be impacted by this alternative.

4.8.1.3 Paleontological Resources

Impacts to paleontological resources would occur if important fossils are damaged or destroyed during project construction. A description of paleontological resources located in this region and potential impacts are presented in Sections 4.2.3.5 and 4.4.5.3.1, respectively. All of the soils located within the North Antelope Mine Loop alignments is classified as PFYC 3.

4.8.2 LAND USE

Potential project impacts to land use would include conversion of current land use to rail line right-of-way, preclusion of existing land uses within the right-of-way, and incompatibility with adjacent land uses. These impacts and others are discussed in more detail in Section 4.4.6. The following provides an overview of the land use types affected by each of the Mine Loop Alternatives.

4.8.2.1 Agriculture

North Antelope East Mine Loop

This alternative would cross 0.3 mile (approximately 14.5 acres) of cropland and 1.1 miles (approximately 53.3 acres) of pasture. No Federal grazing allotments would be crossed by this alternative.

North Antelope West Mine Loop

This alternative would cross 1.9 miles (approximately 92.1 acres) of cropland and 0.5 mile (approximately 24.2 acres) of pasture. No Federal grazing allotments would be crossed by this alternative.

4.8.2.2 Residential

No impacts to residential areas are expected for any of these alternatives.

4.8.2.3 Mineral and Mining

North Antelope East and West Mine Loops

No strip mines, quarries, or gravel pits would be impacted by these alternatives. No reclaimed areas would be crossed. Additional access would be provided to the North Antelope Mine.

4.8.2.4 Federal Lands

4.8.2.4.1 Forest Service Lands

No impacts to USFS lands are expected from either alternative.

4.8.2.4.2 Bureau of Land Management Lands

No impacts to BLM lands are expected from either of the alternatives.

4.8.2.4.3 Bureau of Reclamation Lands

No impacts to Reclamation lands are expected from either of the alternatives.

4.8.2.4.4 Fish and Wildlife Service Lands

No impacts to USFWS lands are expected from either of the alternatives.

4.8.2.4.5 Reservation and Treaty Lands

No impacts to these lands are expected from either of the alternatives.

4.8.2.5 State of Wyoming Lands

North Antelope East and West Mine Loops

No impacts would occur to State of Wyoming lands as a result of either of these alternatives.

4.8.3 WATER RESOURCES

4.8.3.1 Surface Water Impacts

Potential types of impacts to water resources are discussed in detail in Section 4.4.7. Construction and operation of a new rail line could affect water resources by increasing erosion into the water and subsequently reducing water quality, disturbing or altering the stream causing changes in stream hydrology, contaminating water in the event of a spill, and damage to or loss of wetlands.

North Antelope East Mine Loop

This alternative would cross two intermittent streams.

North Antelope West Mine Loop

This alternative would cross four intermittent streams.

4.8.3.2 Wetlands

North Antelope East Mine Loop

Approximately 0.1 mile of aquatic bed wetland (2.9 acres) would be lost during construction of this alternative. Impacts may occur to adjacent wetlands as mentioned above.

North Antelope West Mine Loop

No wetlands would be crossed by this alternative. Impacts may occur to adjacent wetlands as mentioned above.

4.8.4 AIR QUALITY

Construction of either of the North Antelope Mine Loop Alternatives has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

The impacts to air quality during operation would be dependent on the length of the alternative selected and the amount of coal from the North Antelope mines that is actually shipped by DM&E over these mine loops. Since this information will not be determined until operation, the amounts of pollutants cannot be estimated for these track sections. However, in general, the longer mine loop, that being the North Antelope West Mine Loop, would result in more locomotive emissions than the East Mine Loop.

4.8.5 NOISE

The construction and operation of the North Antelope Mine Alternative would increase noise levels along the rail line, as discussed in Section 4.4.9. Operation of construction equipment and train traffic meeting the Board's environmental analysis threshold for noise evaluation would occur along the entire alignment. No communities would be affected by either of these alternatives. These alternatives would not cause noise disturbance for any noise sensitive receptors. However, noise disturbance would occur for wildlife in the area. Potential impacts due to noise are presented in Section 4.4.11.

4.8.6 BIOLOGICAL RESOURCES

4.8.6.1 Vegetation

Impacts to vegetation from these alternatives would be similar to those discussed in Section 4.4.10. They would primarily include the loss of vegetative cover due to construction activities converting the area to rail line right-of-way.

<u>North Antelope East Mine Loop</u>

The loss of 1.4 miles (approximately 223.0 acres) of croplands and pastures and 0.1 mile (approximately 2.9 acres) of wetland vegetation would occur during construction of this alternative.

4.8.4 AIR QUALITY

Construction of either of the North Antelope Mine Loop Alternatives has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

The impacts to air quality during operation would be dependent on the length of the alternative selected and the amount of coal from the North Antelope mines that is actually shipped by DM&E over these mine loops. Since this information will not be determined until operation, the amounts of pollutants cannot be estimated for these track sections. However, in general, the longer mine loop, that being the North Antelope West Mine Loop, would result in more locomotive emissions than the East Mine Loop.

4.8.5 NOISE

The construction and operation of the North Antelope Mine Alternative would increase noise levels along the rail line, as discussed in Section 4.4.9. Operation of construction equipment and train traffic meeting the Board's environmental analysis threshold for noise evaluation would occur along the entire alignment. No communities would be affected by either of these alternatives. These alternatives would not cause noise disturbance for any noise sensitive receptors. However, noise disturbance would occur for wildlife in the area. Potential impacts due to noise are presented in Section 4.4.11.

4.8.6 BIOLOGICAL RESOURCES

4.8.6.1 Vegetation

Impacts to vegetation from these alternatives would be similar to those discussed in Section 4.4.10. They would primarily include the loss of vegetative cover due to construction activities converting the area to rail line right-of-way.

<u>North Antelope East Mine Loop</u>

The loss of 1.4 miles (approximately 223.0 acres) of croplands and pastures and 0.1 mile (approximately 2.9 acres) of wetland vegetation would occur during construction of this alternative.

4.8.4 AIR QUALITY

Construction of either of the North Antelope Mine Loop Alternatives has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

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Impacts to vegetation from these alternatives would be similar to those discussed in Section 4.4.10. They would primarily include the loss of vegetative cover due to construction activities converting the area to rail line right-of-way.

<u>North Antelope East Mine Loop</u>

The loss of 1.4 miles (approximately 223.0 acres) of croplands and pastures and 0.1 mile (approximately 2.9 acres) of wetland vegetation would occur during construction of this alternative.

North Antelope West Mine Loop

The loss of 1.9 miles (approximately 92.1 acres) of cropland and 0.5 mile (approximately 24.2 acres) of pasture vegetation would occur during construction of this alternative.

4.8.6.2 Wildlife

4.8.6.2.1 Big Game

Impacts to big game would be similar to those mentioned previously in Section 4.4.11.1. The only quantifiable impact to big game is the amount of habitat in the species' seasonal ranges converted to rail line right-of-way. Table 4.8-1 lists the number of miles of seasonal ranges crossed by each alternative and the acres converted to rail line right-of-way.

Table 4.8-1
Comparison of Wildlife Habitat between the Alternatives

Big Game Species and Seasonal Range Category	North Antelope East		North Antelope West	
	miles	acres	miles	acres
Elk				
Winter Range	0	0	0	0
Yearlong Range	0	0	0	0
Pronghorn				
Winter Range	0	0	0	0
Yearlong Range	1.5	72.7	2.4	116.4
Whitetail				
Winter Range	0	0	0	0
Yearlong Range	1.5	72.7	0	0
Mule Deer				
Winter Range	0	0	2.1	101.8
Yearlong Range	1.5	72.7	0.3	14.5

4.8.6.2.2 Game Species

Upland Game Birds

Construction and operation impacts resulting from new rail line to upland game birds are discussed in detail in Section 4.4.11.2. There are no sage grouse leks within two miles of any of the four proposed mine loops.

Waterfowl

Potential impacts to waterfowl from construction and operation of new rail line are discussed in detail in Section 4.4.11.2. Impacts from these alternatives would generally include loss of nests and nesting habitat in grassland areas, loss of wetland habitat for adults and brood rearing, and disturbance.

<u>North Antelope East Mine Loop</u>

The North Antelope East Mine Loop would convert 1.4 miles (approximately 67.8 acres) of croplands and pasture that could provide nesting habitat for waterfowl to rail line right-of-way. It would cross 2 intermittent streams and convert 0.1 mile (approximately 2.9 acres) of aquatic bed wetlands to rail line right-of-way.

<u>North Antelope West Mine Loop</u>

This alternative would convert 2.4 miles (approximately 116.4 acres) of croplands and pasture that could provide nesting habitat for waterfowl to rail line right-of-way. It would cross 4 intermittent streams. No wetlands are located within the proposed right-of-way.

Small Game and Furbearers

Potential impacts from new rail line construction and operation to small game animals and furbearers are discussed in Section 4.4.11.2. Those impacts would be similar to the types of impacts expected from either North Antelope Mine Loop Alternatives. As these species are found in nearly all habitats and are wide ranging, construction of either alignment would have the potential to disturb them and reduce their habitat. Both alternatives would also likely result in some mortality to these species during operation.

4.8.6.2.3 Non-Game Species

Amphibians and Reptiles

The construction and operation impacts to amphibians and reptiles discussed in Section 4.4.11.3 would be similar to those expected for the Black Thunder and North Antelope Mine Loop Alternatives. Reptiles and amphibians could occur anywhere along the alternatives and their lack of mobility makes them susceptible to mortality during construction and operation of a rail line. However, the Black Thunder Mine Loops would likely have a greater impact to these species due to its location along the North Prong Little Thunder Creek and many stream crossings, which provide a potential source of water for amphibian habitat and breeding and foraging areas for reptiles.

Songbirds

The primarly impact to songbirds from construction and operation of the proposed alignment alternatives would be the loss of nesting habitat. Songbirds within the project area include both ground and tree nesters. However, no woody vegetation would be affected by either alternative. The North Antelope Mine Loops would convert approximately 72.7 acres (East Loop) and 116.4 acres (West Loop) of pasture and cropland to rail line right-of-way.

Shorebirds

Impacts to shorebirds would be similar to those discussed for waterfowl.

Small Mammals

Small mammals would be impacted during construction and operation by loss of habitat and mortality, as discussed in Section 4.4.11.3. Small mammals are expected to occur throughout the project area and along both of the alternatives. Loss of habitat and any mortality are expected to be similar for both alternatives due to the similar habitat affected. However, because of the high reproductive potential of small mammal species and the limited amount of potential habitat lost, both the alternatives would have similar and generally minimal impacts to small mammal populations.

Raptors

The potential impacts to raptors from the North Antelope Alternatives would be similar to those discussed in Section 4.4.11.3. Both alternatives would convert foraging lands and potential ground-nesting habitat to rail line right-of-way. Noise and activity during construction and operation could disturb nesting raptors resulting in nest abandonment or failure. Table 4.8-2 provides information on raptor nests within proximity to the alternatives. Raptors could be struck by trains if feeding on carrion along the rail line during the winter.

Table 4.8-2
Comparison of Raptor Nesting Sites between the North AntelopeAlternatives

Raptor Types Present along each Alternative	Number of Nests and Distance		
	0.25 Mile	0.5 Mile	1.0 Mile
North Antelope East			
Golden Eagle	1	1	2
Great Horned Owl	1	1	1
North Antelope West			
Red-Tail Hawk	1	1	1
Golden Eagle	0	1	1
Great Horned Owl	0	0	1

4.8.6.3 Aquatic and Fisheries

Potential impacts to aquatic and fishery resources include loss of habitat and reduced water quality as discussed in Section 4.4.11.4. No trout streams are crossed by any of the alternatives. Impacts to aquatic and fishery resources would be most likely to occur in areas where the alternatives are in close proximity to streams or drainages or at stream crossings.

4.8.6.4 Endangered, Threatened, and Sensitive Species

The following section discusses the potential impacts to those Federally listed threatened or endangered species known to occur or potentially occur along the North Antelope Mine Loop Alternatives.

4.8.6.4.1 Mountain Plover

The potential impacts to mountain plovers would be similar to those types of impacts discussed in Section 4.4.12.8. They would generally include destruction of nests during construction and disturbance to nesting birds leading to nest failure during both rail line construction and operation. Mountain plover nests and chicks would be particularly susceptible to mortality from vehicles and construction equipment, especially along two-track roads and where construction activities would cross prairie dog towns. The nesting habitat for plovers in the project area would include short-grass prairie and black-tailed prairie dog colonies. Surface disturbances to prairie dog colonies could displace nesting mountain plovers in the area.

North Antelope East Mine Loop

The North Antelope East Mine Loop does not pass through any prairie dog colonies and would cross approximately 0.3 mile of cropland and 1.1 miles of pasture.

North Antelope West Mine Loop

The North Antelope West Mine Loop would pass through prairie dog colonies for 0.6 mile and cross approximately 1.9 miles of cropland and 0.5 mile of pasture.

4.8.6.4.2 Bald Eagle

Impacts to wintering bald eagles would occur from human activity associated with project construction, operation and maintenance, as well as loss of potential habitat for nesting, perching, and roosting along 2.3 miles of riparian habitat located within 0.5 mile of Antelope Creek. No nest are located in proximity to the proposed mine loops.

4.8.6.4.3 Swift Fox

Swift fox may occur in a variety of habitats throughout the project area (Section 4.4.12.9 and Appendix K). Impacts could include loss of habitat and mortality if struck by a train. Swift fox are known to utilize prairie dog colonies, primarily for prey. Therefore the amount of prairie dog colony converted to rail line serves as a means to compare the potential impacts of each alternative. Surface disturbance to prairie dog colonies will reduce potential habitat availability for Swift Fox.

North Antelope East Mine Loop

No prairie dog colonies are located within the proposed East Mine Loop alignment.

North Antelope West Mine Loop

The North Antelope West Mine Loop would pass through prairie dog colonies for 0.6 mile.

4.8.6.4.4 Black-tailed Prairie Dog

Direct impacts to black-tailed prairie dogs are most likely to occur during construction if the animals occur in the right-of-way. Burrows and dens of inhabitated colonies and within the construction right-of-way would be destroyed. Some mortality to individuals would also be expected during excavation and other earthmoving activities. During rail line operation, fragmentation of colonies could reduce their ability to sustain themselves as well as result in mortality to individuals crossing the rail line from one area of the colony to the other. The North Antelope West Mine Loop would pass through 0.6 mile of prairie dog colonies. No colonies would be crossed by the East Mine Loop.

4.8.7 TRANSPORTATION

Transportation impacts would be similar to those described in Section 4.4.13. They would include increased vehicle traffic and delays at new grade crossing during construction and vehicle delays due to passing trains during operation. SEA concluded that the potential effect of increased train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and the additional vehicular delay would be minimal. None of the Mine Loop Alternatives have any public highway/railroad grade crossings where average daily traffic (ADT) volumes are 5,000 or greater. Therefore, SEA did not calculate potential vehicle delay or queue at these new crossings.

<u>North Antelope East Mine Loop</u>

This alternative would not cross any state, county, or grassland roads.

<u>North Antelope West Mine Loop</u>

The North Antelope West Mine Loop would cross one road, Irwin Road (ADT of 100) in Converse County.

4.8.8 SAFETY

Construction and operation of a rail line has the potential to result in injury or loss of life, particularly at locations where the rail line would cross an active roadway grade. Vehicles operating across the rail line would be at risk of accidents during construction as well as being struck by a train during rail line operation. Section 4.4.14 provides a detailed discussion of the potential affects of construction and operation of new rail line on safety.

4.8.6.4.4 Black-tailed Prairie Dog

Direct impacts to black-tailed prairie dogs are most likely to occur during construction if the animals occur in the right-of-way. Burrows and dens of inhabitated colonies and within the construction right-of-way would be destroyed. Some mortality to individuals would also be expected during excavation and other earthmoving activities. During rail line operation, fragmentation of colonies could reduce their ability to sustain themselves as well as result in mortality to individuals crossing the rail line from one area of the colony to the other. The North Antelope West Mine Loop would pass through 0.6 mile of prairie dog colonies. No colonies would be crossed by the East Mine Loop.

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To further address potential accidents resulting from new grade crossings, SEA calculated accident frequency rates at proposed public grade crossings. SEA's analysis procedure considered the type of warning devices at the highway/rail grade crossing, including passive devices (signs and crossbucks), flashing lights, or gates.

SEA evaluated traffic levels at 20 MNT (8 trains), 50 MNT (18 trains), and 100 MNT (34 trains). The amount of rail traffic along each alternative would be dependent on the amount of coal hauled by DM&E from the North Antelope Mine. The actual level of rail traffic has not yet been determined. As no contracts are currently in place, these evaluation levels are used to provide an assessment of the potential impacts along these mine loop alternatives at various levels of coal transportation from the mines. They do not represent the anticipated rail traffic at the 20 MNT, 50 MNT, and 100 MNT level of total project operation. SEA estimates that the projected levels of traffic from the North Antelope Mine would not exceed 20 MNT.

North Antelope East Mine Loop

The North Antelope East Mine Loop would have no impact on safety as it would have no roadway crossings.

North Antelope West Mine Loop

Converse County

20 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Irwin Road at the 20 MNT level of operation. The estimated annual accident frequency would increase from 0.010 to 0.016. This translates into an increase of 0.007 with an accident frequency of 1 accident every 152 years. The proposed crossing would be classified as Catagory B.

50 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Irwin Road at the 50 MNT level of operation. The estimated annual accident frequency would increase from 0.010 to 0.020. This translates into an increase of 0.011 with an accident frequency of 1 accident every 94 years. The proposed crossing would be classified as Catagory B.

100 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Irwin Road at the 100 MNT level of operation. The estimated annual accident frequency would increase from 0.010 to 0.025. This translates into an increase of 0.015 with an accident frequency of 1 accident every 65 years. The proposed crossing would be classified as Catagory B.

4.8.9 HAZARDOUS MATERIALS

Section 4.4.15 provides a detailed discussion of the potential project related impacts to hazardous materials transportation and sites. Because no hazardous materials are anticipated to be transported over Alternatives B, C, or D, neither the Black Thunder or North Antelope Mine Loops would have any impact on their transportation. No hazardous waste sites have been identified along either of the alternatives. However, construction of either rail line could impact them if unknown sites are located within the rail line right-of-way. DM&E should coordinate with the EPA and Wyoming Department of Environment and Natural Resources to obtain specific information on the location of known hazardous materials sites. However, due to the undeveloped and remote location of these alignments, no such sites are anticipated to occur along either the Black Thunder or North Antelope Mine Loops.

4.8.10 ENERGY RESOURCES

Section 4.4.16 provides a detailed discussion of the potential impacts that would include the effects of the new mine loop alternatives on energy resources, their transportation and utilization. No recyclable commodities would be transported by either alternative.

4.8.11 CULTURAL RESOURCES

Potential impacts to cultural resources located in Wyoming within the proposed project area are presented in Section 4.2.17. The project area has a rich and long history of human occupation and known sites of archaeological significance occur throughout the area. Potential impacts could occur to cultural resources as a result of new rail line construction. Inadvertent discovery of archaeological sites may damage or destroy significant sites. No archaeological sites are known along the alternatives. The lack of known sites along the alternatives is most probably due to the lack of archaeological survey and study in the area due to its remoteness and undeveloped character. Any impacts to discovered cultural resource sites associated with new construction would require mitigation in accordance with the PA (Appendix J).

100 MNT

SEA determined that the proposed construction would significantly increase the predicted accident risk at crossing Irwin Road at the 100 MNT level of operation. The estimated annual accident frequency would increase from 0.010 to 0.025. This translates into an increase of 0.015 with an accident frequency of 1 accident every 65 years. The proposed crossing would be classified as Catagory B.

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4.8.12 SOCIOECONOMICS

The North Antelope Mine Loops comprise a portion of the construction and operation of new rail line that would occur throughout Converse Counties. Because they comprise only a small portion of the proposed construction within these counties, the overall difference in their anticipated socioeconomic impacts to the counties in which they are located should be minimal. Therefore, the socioeconomic impacts of the North Antelope Alternatives are included as part of the total socioeconomic impacts anticipated for the project. These impacts are discussed in detail in Section 4.4.16.

4.8.13 ENVIRONMENTAL JUSTICE

Neither of the North Antelope Alternatives would potentially impact any environmental justice communities.

4.8.14 RECREATION

Impacts to recreation from the North Antelope Alternatives would be similar in nature for each of the proposed alignments. The type of potential impacts would be similar to those discussed in Section 4.4.20. Generally, these impacts would include disturbance to individuals participating in a variety of recreational activities such as hunting, camping, horseback riding, and hiking. Additional lands adjacent to the right-of-way may also be considered by the public or landowners as undesireable due to trains disturbing horses during riding, game during hunting, and campers trying to sleep. During construction and operation, big game hunting (an important recreational activity in the area) may be particularly affected by noise and human presence. Noise and human activities would both cause game to seek areas undisturbed by these activities and, for safety reasons, require hunters to avoid areas near the rail line. This would further reduce the lands available for recreation.

In addition to noise disturbance, rail line construction and operation may also reduce the attractiveness of an area for recreation due to the alteration of the visual setting of the area. Construction and operation of a rail line would create an intrusion into the landscape considered by some to be unattractive, resulting in individuals changing their recreational patterns to avoid areas within site of the rail line.

Because these alternatives cross mainly private lands, as discussed for each alternatives below, and the alternatives pass through remote areas, impacts to recreation would generally occur to a small number of individuals, including landowners, their families, and guests.

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Because these alternatives cross mainly private lands, as discussed for each alternatives below, and the alternatives pass through remote areas, impacts to recreation would generally occur to a small number of individuals, including landowners, their families, and guests.

North Antelope East Mine Loop

No public lands would be crossed by this alternative. Construction of the 1.5-mile North Antelope East Alternative would directly remove approximately 72.7 acres of private land from recreational use.

North Antelope West Mine Loop

No public lands would be crossed by this alternative. Construction of the 2.4-mile North Antelope East Alternative would directly remove approximately 116.4 acres of private land from recreational use.

4.8.15 AESTHETICS

Section 4.4.21 provides a detailed discussion of the potential project related impacts to the aesthetics of the project area. As noted in Section 4.4.21, no designated scenic areas or overlooks occur along the project alternatives, although many areas are considered by landowners and visitors as scenic. Additionally, the USFS has developed VQOs for lands under its management in an attempt to quantify the scenic value of its areas (Section 4.4.21). Each of these alternatives would create a visual intrusion into the current landscape, altering the visual quality.

There is also concern that emissions from operating locomotives could contribute to regional haze and impact visibility. The minimal emissions that would result along the North Antelope Alternatives, due to their short length, would not result in any reduction in air quality for these areas. However, as part of the total project, emissions along these alternatives could affect air quality for these areas. The North Antelope Mine Loops do not cross USFS lands.

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4.9 SOUTH DAKOTA BYPASS - BROOKINGS

During the scoping process for this project, two proposals for bypasses of communities along the existing DM&E rail line in South Dakota were received by SEA. These proposals were for a bypass of Brookings and Pierre. As discussed in Chapter 2, SEA reviewed these proposals. SEA determined the Pierre bypass proposal would result in significant impacts to the environment, as well as pose significant permitting and feasibility concerns. The Pierre proposal was therefore dropped from further analysis. SEA found the Brookings Bypass to be reasonable, although it too would result in environmental impacts. The following discusses the results of SEA's impact analysis of the Brookings Bypass alternatives.

The following compares the potential impacts along the existing DM&E rail line through Brookings to those resulting from construction of the proposed bypass north of the city. Based on the DM&E siding plan, SEA determined that one siding location is proposed for the existing rail segment of Alternatives B-2 and B-3. The potential impacts discussed in this section are only those anticipated to occur as a result of the alternatives listed below. The alternatives evaluated include:

Alternative B-1: No-Action

This alternative would involve denial of the total project. No new rail construction or existing rail line reconstruction would occur. DM&E would continue to operate under existing conditions.

Alternative B-2: Existing Rail Line

This alternative would involve reconstruction of approximately 13.3 miles of existing DM&E rail line through Brookings, South Dakota. All train traffic, existing and future, would utilize this rail line.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Alternative B-3 would include continued maintenance of the 13.3-mile segment of existing DM&E rail line through Brookings. It would also include construction and operation of the bypass proposed by the City of Brookings. The existing rail line through town would not be reconstructed as part of this alternative. The proposed bypass would extend approximately 14.5 miles around the north side of Brookings, connecting with the existing rail line at either end. Existing rail traffic (three trains per day) would remain on the existing rail line. Coal trains would be routed over the bypass.

Alternative B-4: Bypass for all Rail Traffic

This alternative would be similar to Alternative B-3, except the existing rail line would not be used for existing rail traffic. All rail traffic, except that required to serve shippers in Brookings, would operate over the bypass.

Alternative B-1, No-Action

The No-Action Alternative, B-1, for Brookings would involve denial of the overall PRB Extension Project by the Board, as noted above. The No-Action Alternative would result in no construction activities related to rehabilitation of the existing rail line and no operational changes in train activity through Brookings. None of the construction impacts associated with reconstruction of the existing line would occur, such as:

- disruption to adjacent land uses,
- conversion of land to rail related facilities,
- disturbance to and erosion of soil,
- clearing of vegetation,
- disturbance of wildlife,
- air emissions from construction vehicles and fugitive dust,
- increases in noise from construction equipment,
- disruption of traffic flow at grade crossings, and
- increased economic activity from construction workers,

Additionally, none of the operational impacts would occur. Noise levels along the existing rail line would remain the same, as would air emissions from locomotives, vehicle delays at grade crossings, and train and vehicle safety. DM&E's safety record would be expected to remain at or below its current level with a continued deterioration of the existing rail line. Service and reliability concerns of existing shippers, as discussed in Chapter 1, would continue, reducing the competitiveness of these shippers in their respective markets. This lack of competitiveness and rail service reliability would likely result in a greater reliance of shippers on trucks for transportation, resulting in additional trucks being added to local roadways. Increased truck numbers would increase wear on roads within Brookings and reduce vehicle safety. Lack of improvements to the existing conditions of the DM&E rail line may jeopardize the viability of the rail line causing loss of rail service. The associated loss of jobs and tax revenue, with the DM&E headquarters located in Brookings, could have economic impacts within Brookings and small neighboring communities where many railroad employees reside.

The following sections discuss the potential impacts of each of the alternatives for each natural and human resource evaluated.

4.9.1 CLIMATE

No impacts to the climate of the Brookings area would result from the construction of any of these alternatives.

4.9.2 TOPOGRAPHY

Alternative B-1: No-Action

No reconstruction or construction activities would result from this alternative. Modifications to the local physiography would have been made when the original railroad was built nearly 100 years ago. No further impacts would result from this alternative.

Alternative B-2: Existing Rail Line

The reconstruction and operation of Alternative B-2 would not likely alter the physiography of the project area. However, channelization and bank modifications may be required at stream crossings due to construction and modification of bridges over the Big Sioux River, Sixmile Creek, and other area streams. Drainage outside the railroad right-of-way could be changed. These changes are not expected to be significant.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

The portion of this alternative that utilizes the existing rail line would cause no additional impacts to the physiography of the project area. No construction or reconstruction activities would occur along the existing rail line.

The construction of the bypass portion of Alternative B-3 would create changes in the physiography of the project area due to cut and fill operations designed to provide a suitable grade for construction of the proposed rail line. The drainage of the project area could be affected by alterations in the terrain as a result of these activities. Channelization and bank stabilization may be required at stream crossings along Alternative B-3. Significant cut and fill could be necessary for part of the alternative, particularly where it would cross the Big Sioux River. Any changes to the natural course of a stream could alter drainage in the project area. During operation of Alternative B-3, the presence of the rail bed could create a damming effect for surface water which could alter drainage in adjacent areas.

The following sections discuss the potential impacts of each of the alternatives for each natural and human resource evaluated.

4.9.1 CLIMATE

No impacts to the climate of the Brookings area would result from the construction of any of these alternatives.

4.9.2 TOPOGRAPHY

Alternative B-1: No-Action

No reconstruction or construction activities would result from this alternative. Modifications to the local physiography would have been made when the original railroad was built nearly 100 years ago. No further impacts would result from this alternative.

Alternative B-2: Existing Rail Line

The reconstruction and operation of Alternative B-2 would not likely alter the physiography of the project area. However, channelization and bank modifications may be required at stream crossings due to construction and modification of bridges over the Big Sioux River, Sixmile Creek, and other area streams. Drainage outside the railroad right-of-way could be changed. These changes are not expected to be significant.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

The portion of this alternative that utilizes the existing rail line would cause no additional impacts to the physiography of the project area. No construction or reconstruction activities would occur along the existing rail line.

The construction of the bypass portion of Alternative B-3 would create changes in the physiography of the project area due to cut and fill operations designed to provide a suitable grade for construction of the proposed rail line. The drainage of the project area could be affected by alterations in the terrain as a result of these activities. Channelization and bank stabilization may be required at stream crossings along Alternative B-3. Significant cut and fill could be necessary for part of the alternative, particularly where it would cross the Big Sioux River. Any changes to the natural course of a stream could alter drainage in the project area. During operation of Alternative B-3, the presence of the rail bed could create a damming effect for surface water which could alter drainage in adjacent areas.

Alternative B-4: Bypass for all Rail Traffic

Construction of a bypass could create impacts to the physiography of the project area similar to those described for the construction and operation of the bypass portion of Alternative B-3.

4.9.3 GEOLOGY AND SOILS

4.9.3.1 Geology and Soils

Alternative B-1: No-Action

Any soil impacts associated with reconstruction of the existing rail line would not be experienced with this alternative. Operational impacts would be limited to the potential for soil contamination from a derailment or accidental spill. Minor localized soil disturbance resulting from general maintenance of the existing rail line could also occur. No prime farmland would be affected. Land within the existing corridor was made unavailable for agricultural production when the existing rail line was constructed nearly 100 years ago.

Alternative B-2: Existing Rail Line

This alternative, approximately 13.3 miles, would involve reconstruction within an already disturbed and established rail corridor. Therefore, impacts to soil would be minimal. Potential impacts resulting from this alternative would generally be limited to the soils within the right-of-way. Potential impacts during construction could include erosion, compaction from heavy equipment, mixing, and loss of productivity in undeveloped areas. These impacts could affect revegetation of any disturbed areas within the right-of-way. Impacts during operation could include localized soil disturbance from maintenance of the railroad right-of-way. Potential spills of hazardous substances could cause contamination of streams during operation. However, spills are unlikely due to expected reduction in derailments and compliance with regulatory procedures for handling, storing, and disposing of potential contaminants.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

The existing rail line segment of Alternative B-3 would have the same potential impacts as described above for Alternative B-1.

The bypass portion of this alternative would impact areas that are not currently used for railroad activities. Soils located along the bypass alignment consist primarily of silty clay loams with some silt loam and loam present. The dominant soil types in the area consist of Lamoure silty clay loam, Volga silty clay loam, and Vienna loam. These soils are nearly level with slopes of 0-2 percent. Top soil depths range from 0 to 20 inches. The silty clay loam soils are somewhat poorly drained and are found in higher and less concave alluvial positions. Approximately 659.4 acres of soil would be disturbed during construction of the 14.5-mile bypass north of Brookings. The removal of vegetation during the construction process would increase the possibility of erosion resulting from wind and rain.

Construction activities using heavy equipment would compact the soil decreasing its productivity. Approximately 127.2 acres of prime farmland would be converted to railroad right-of-way. Cut and fill operations could cause mixing of soil profiles. Impacts would be primarily restricted to the proposed rail line right-of-way.

Potential contamination could occur due to accidental spills of hazardous substances during construction or operation of the proposed rail line. However, spills are unlikely due to improved track conditions and compliance with regulatory procedures for handling, storing, and disposing of potential contaminants.

Alternative B-4: Bypass for all Rail Traffic

Construction and operation impacts would be the same as those described for the bypass segment of Alternative B-3. Construction of a 14.5-mile bypass around the City of Brookings would impact the soil in areas not currently used for railroad activity. Construction of Alternative B-4 could increase the potential for erosion and the possibility of contamination from hazardous substances in the unlikely event of a spill, as described for the bypass segment of Alternative B-3.

4.9.3.2 Paleontological Resources

Paleontological resources may occur throughout the Brookings project area, primarily in gravel deposits and bedrock. Any such resources occurring along the existing rail line right-of-way for Alternatives B-1, B-2, or B-3 were likely destroyed during initial construction of rail facilities within the rail corridor. Only minimal excavation is anticipated during construction and reconstruction due to most of each of the alignments being relatively level. Excavation would largely include surface earthwork within previously disturbed areas. Additionally, the deep soils and agricultural cultivation in the project area and scattered nature of paleontological resources make it unlikely such resources would be encountered. Disturbance of bedrock or sediment is not anticipated. However, cut activities along the Big Sioux River could encounter such resources. Construction of the bypass portion of Alternatives B-3 and B-4 could disturb paleontological resources that may be present in the area, although this is considered unlikely.

4.9.4 LAND USE

The potential changes to local land use due to construction and operation of the proposed project are evaluated in this section. The land use types evaluated include agricultural, residential, business and industrial, and public lands. Land used for roadways and distances across rivers and streams are not evaluated as land use in this section and accounts for land use totals not adding up to the total distance. Impacts to public facilities such as hospitals and schools are generally addressed in this section as components of land use categories, but are not quantified as a land use type.

4.9.4.1 Agriculture

The approximate amount of land use designated as agricultural was measured and calculated to determine the linear miles adjacent to each alternative. Land deemed to be agricultural is that which appears to be or has been cultivated for the production of crops and pasture or grassland that has not been cultivated. Woodland is also included in this category.

Alternative B-1: No-Action

This alternative would not cause any impacts to approximately 10.2 miles of cropland and approximately 5.6 miles of pasture and grassland adjacent to the existing DM&E rail line. No construction or reconstruction activities would occur, and there would be no loss of agricultural land associated with this alternative.

Alternative B-2: Existing Rail Line

The existing rail line would be adjacent to approximately 10.2 miles of cropland and approximately 5.6 miles of pasture and grassland in Brookings, South Dakota. The majority of reconstruction for this alternative would occur within the existing rail corridor. Potential impacts to agricultural land could include soil compaction and crop damage from construction equipment where cropland has encroached on the existing right-of-way or should construction activities be required outside the existing right-of-way. The risk of derailment, crop damage, and safety at public grade crossings for area farmers and motorists would potentially be reduced from the current Alternative B-1 levels due to the improved condition of the DM&E rail system in the area.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

The portion of this alternative that utilizes the existing rail line for existing traffic would create no additional impacts.

The bypass segment of this alternative would cross approximately 11.8 miles of cropland, resulting in Alternative B-3 being adjacent to 23.6 additional miles of cropland following construction. Construction of the bypass segment of this alternative would result in a loss of approximately 284.8 acres of agricultural land. Approximately 2.5 acres of wooded fence rows would be cleared. Long-term impacts to agricultural use would include the conversion of approximately 127.2 acres of prime farmland to railroad right-of-way. While farmers would be compensated for this land, they would no longer have the farm revenue generated from use of these acres. Potential impacts during construction could also include soil mixing and compaction, crop damage, and erosion.

During construction and throughout operation of the proposed rail line, area farmers could be affected by reduced access to fields and safety concerns. The proposed rail line would cross numerous agricultural fields, resulting in portions of those fields being located on opposite sides of the rail line from the farmer's headquarters. Access to these areas would be limited to existing roads or, if installed, equipment crossings of the proposed new rail line. During operation of the project, farmers would be required to either drive equipment on local roads, crossing the proposed rail line at public grade crossings to access these fields, or cross the proposed rail line at unprotected private crossings. Under both scenarios, farmers would experience increased inconvenience and reduced safety. Farmers would be required to cross the rail line at unprotected crossings to move farm machinery or travel on roadways with large, slow moving farm machinery, which would create a safety hazard to themselves, motorists traveling on the same roadways, and operating trains and their crews. In some cases, the field on one side of the line could be of too small a size to economically continue to farm. These lands could be sold to adjacent farmers and consolidated with other existing fields, or taken out of production and left fallow. Removal from production would decrease the available land and production of these farms, reducing farm income.

Alternative B-4: Bypass For all Rail Traffic

Construction of Alternative B-4 would result in the loss of approximately 284.8 acres of agriculture land. Impacts during construction and operation of Alternative B-4 would be the same as those presented for the bypass segment of Alternative B-3.

4.9.4.2 Residential

Alternative B-1: No-Action

Residential land, approximately 2.0 miles, adjacent to the existing rail line would continue to experience the same conditions that are currently present. No additional residential land would be affected by Alternative B-1.

Alternative B-2: Existing Rail Line

Approximately 2.0 miles of residential land would be adjacent to Alternative B-2. Impacts to residential areas resulting from the reconstruction and operation of the railroad would be similar to those discussed in Section 4.3.6.2 and include increased noise, dust, safety concerns, and traffic delays. These specific impacts are discussed in more detail for Brookings in Sections 4.9.1.6 (Air Quality), 4.9.1.7 (Noise and Vibration), 4.9.1.12 (Transportation), and 4.9.1.13 (Safety).

In addition to these impacts, residents of Brooking expressed concerns during scoping that residential real estate values would decrease due to increased rail traffic. SEA recognizes real estate values are partially a reflection of what people are willing to pay to live in a particular location and the environment that location provides. While some persons may not be affected by rail traffic, others may wish to avoid it. Thus a persons willingness to locate near an active rail line is a result of their perception of the condition and their sensitivity to it. The Brookings Register reported on June 14, 2000 that, although the PRB Expansion Project still has not been decided upon, homes along the existing rail line have maintained their value and are selling at a comparable rate to homes elsewhere in Brookings.[1] Much of this seems to be due to staffing and student attendance associated with South Dakota State University, located in Brookings. Such activity would continue regardless of the outcome of the Board's decision on this project.

In some cases, a person may have little other choice but to purchase a home along the rail line. This may be the case should this project be approved. Project approval would require DM&E to hire additional staff, some of whom would likely need to relocate to the Brookings headquarters. Because few other communities are close to Brookings, many new employees would likely elect to live in Brooking, increasing the demand for housing and helping to support real estate values.

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[1] The article was published June 14, 2000 in the Brookings Register, written by John Kubal, titled "Homes moving well". The article includes several quotes and statistics from local real estate professionals.

SEA understands the concerns of local residents along the rail line, particularly those currently residing along the rail line. Increased rail operations would certainly change the environment for these residences. However, while these residents are concerned about real estate values, SEA does not believe significant declines to real estate values would occur as a result of Alternative B-2.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Under this alternative, the impacts to the 2.0 miles of residential land along the existing rail line would remain the same. Construction of a bypass to route future coal traffic north of Brookings would impact approximately 0.4 additional mile of residential land that would be adjacent to the bypass. Construction of Alternative B-3 could potentially require the acquisition and removal of as many as 2 houses that would potentially be located within the proposed rail line right-of-way and conversion of approximately 4.4 acres of residential land to rail line right-of-way. Potential construction impacts would include relocations, increased noise for rural residents, dust, traffic delays, and safety concerns. During operation, residences near the bypass would experience noise from passing trains, vehicle delays and potential safety concerns at new grade crossings, and potential impacts to real estate values. These impacts are discussed in greater detail in the Noise, Transportation, Safety, and Socioeconomic subsections. Additionally, the presence of the bypass could make the lands around it unattractive for future residential development.

Alternative B-4: Bypass for all Rail Traffic

Impacts due to construction and operation of Alternative B-4 would be the same as those presented for the bypass portion of Alternative B-3.

4.9.4.3 Business and Industrial

Business and industrial land would include areas which contains shops, store fronts, manufacturing facilities, and other places of commerce. The potential types of impacts to business and industrial lands are described in Section 4.3.6.3 and could include increased noise, dust, safety concerns, and traffic delays.

Alternative B-1: No-Action

Businesses, located along approximately 3.8 miles of commercial land adjacent to the existing route, would continue to experience the current level of impact. Businesses, both future and existing, would not experience the benefits of a safe, reliable railroad. Potential improvements in rail service would not be available.

Alternative B-2: Existing Rail Line

Approximately 3.8 miles of business and industrial land lies adjacent to the 13.3 miles of existing rail line through Brookings. Impacts during reconstruction would be similar to those described in Section 4.3.6.3. Temporary impacts, such as reduced access for customers and employees, safety concerns due to the presence of large construction equipment, and possible interruption of rail service, could affect businesses and shippers located adjacent to the existing rail line during construction. During construction and operation, increased noise, dust, and traffic delays could affect businesses adjacent to the existing rail corridor. Conditions would likely improve during operation, following reconstruction of the existing rail line.

During operation, shippers, including L.G. Everist, Inc., Minnesota Mining & Manufacturing Company, Farmers Co Op, Perry Electric, Rainbow Play Systems, South Dakota/Dacotah Cement, South Dakota Soybean Processors, Land O'Lakes Agricultural Service Center, and Land O'Lakes Dairy, would be provided with improved rail service and safety for transport of products and materials. Efficient rail service combined with close access to Interstate 29 and U.S. Highway 14, and the open, relatively level lands outside Brookings could make the area more attractive to new business and industry.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Businesses located along the approximately 3.8 miles of commercial property, located adjacent to the existing rail line, would continue to experience the current level of impact.

No commercial property would be crossed by the proposed bypass portion of Alternative B-3. The bypass portion of Alternative B-3 would offer the opportunity for new businesses to have access to modern and efficient rail service. Properties adjacent to the proposed bypass, that are suitable for industrial development, may increase in value.

Alternative B-4: Bypass for all Rail Traffic

No land described as commercial would be crossed by the proposed bypass or impacted by the construction of Alternative B-4. New businesses could be attracted to the area by the benefits of a new modern rail line and potential for new commercial development.

4.9.4.4 Public Services

Alternative B-1: No-Action

Public services in and around Brookings would continue to experience the current level of impacts from the operation of the DM&E railroad. Deteriorated track conditions pose a higher risk of accident and derailment which could require public services such as police, fire department, and ambulance services in the event of such an occurrence.

Alternative B-2: Existing Rail Line

The existing railroad corridor in Brookings passes within approximately 900 feet of the nearest church. The existing rail corridor also passes within approximately 0.5 mile of the nearest hospital and approximately 0.2 mile of the nearest school. Due to the distance from the existing rail line, impacts of noise and dust during reconstruction should not affect these facilities. During reconstruction and operation, users of these facilities could experience traffic delays, increased road traffic, and safety concerns as discussed in Section 4.3. Emergency vehicles could potentially experience inconvenience and reduced access, due to reconstruction at grade crossings or a passing train blocking a crossing used to access public facilities.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Conditions along the existing rail line would be the same as those presented for Alternative B-1. The proposed bypass segment would lie within 0.6 mile of the nearest church, 1.7 miles of the nearest hospital, and 0.7 mile of the nearest school. Patrons of these public facilities would likely experience inconvenience and traffic delays due to closed crossings during construction or a passing train, which would block crossings along rural roadways used to access public facilities. Due to the low level of traffic, distance of crossings from these facilities, and the rural setting in the area, these impacts would not have a significant effect on use of public facilities. During operation, rail traffic through grade crossings located along the proposed rail line could require establishment of new routes for emergency vehicles to avoid vehicle delays during an emergency event.

Alternative B-4: Bypass for all Rail Traffic

Impacts from Alternative B-4 would be the same as those presented for the bypass segment under Alternative B-3.

4.9.4.5 Public Lands

Alternative B-1: No-Action

No public lands are crossed by Alternative B-1. Lions Park is located adjacent to the existing rail in Brookings. Lions Park has a basketball court, play ground equipment, and picnic facilities. Pioneer Park, located approximately 600 feet north of the existing rail line, is the location of the annual Brookings Summer Arts Festival. Hillcrest Park is approximately 0.5 mile north of the existing rail line. It contains facilities for swimming, tennis and racquetball. No additional impacts beyond the existing noise, access, and safety concerns presented by existing rail operation to the park or its users would result from this alternative.

Alternative B-2: Existing Rail Line

No public lands are crossed by Alternative B-2. However, several parks, as noted under Alternative B-1, are near the existing rail line. Impacts during reconstruction and operation of the existing rail line could include increased noise disturbing users, safety concerns for pedestrians and children going to and from the parks, and reduced access to park facilities due to delays at nearby grade crossing during increased train crossing events.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Impacts along the existing rail line would be the same as those presented for Alternative B-1. No public lands are crossed by Alternative B-3. However, the South Dakota Assembly of the Church of God camp, a 14-acre facility located along the west side of the Big Sioux River, would be adjacent to the south side of the proposed bypass route. Impacts to this property, during construction and operation, could include increased noise, dust, safety concerns, and inconvenience for those using camp facilities in close proximity to the proposed bypass rail line.

Alternative B-4: Bypass for all Rail Traffic

Construction and operation conditions would be the same as those described for the bypass segment of Alternative B-3.

4.9.5 WATER RESOURCES

4.9.5.1 Surface Water Impacts

Alternative B-1: No-Action

There are 12 surface water bodies, 10 intermittent streams, 1 perennial (Big Sioux river) stream, and 1 perennial stretch within an intermittent stream, crossed by Alternative B-1. Because no construction or reconstruction would occur at these waterway crossings, no impacts would occur to these surface waters as a result of this alternative.

Alternative B-2: Existing Rail Line

The 12 water body crossings present along Alternative B-1 would also be present along Alternative B-2. Impacts to streams such as increased sedimention from erosion and instream work during reconstruction of the existing rail line, would be considered temporary as they would only occur during the short time of construction (about a day for culvert placement and reconstruction of 1.0 mile of rail line, and approximately 14 days for bridge placement). Also during reconstruction, erosion at these water crossings or along the remainder of the rail line could affect water quality within nearby, downstream lakes and waterways, such as Goldsmith Lake, Sixmile Creek, North Deer Creek and downstream portions of the Big Sioux River. Long term impacts could result from alterations to stream banks and beds during reconstruction at crossings changing stream flow patterns. Section 4.3.7.1 describes the potential impacts, such as increased total suspended solids (TSS) and contamination from potential chemical spills, resulting from the reconstruction and operation of existing rail line. Potential spills of hazardous substances could cause contamination of streams during operation. This contamination would likely be temporary, lasting until completion of clean up measures or the contaminate is diluted or flushed from the site by stream flow. However, spills are unlikely due to expected reduction in derailments and compliance with regulatory procedures for handling, storing, and disposing of potential contaminants.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Under Alternative B-3, no impacts would occur at the existing water crossing along the existing rail line.

The proposed bypass portion of Alternative B-3 would cross 20 streams. Of these, 19 are intermittent and 1, the Big Sioux River crossed once, is perennial. These streams could be temporarily affected during construction. Disturbed earth and removal of ground cover adjacent to stream crossings could cause soil erosion within the proposed right-of-way, leading to sedimentation and increased TSS in surface waters. Installation of culverts and bridges would require instream work that could disturb bottom sediments and increase suspended material. Some channelization and realignment of streams may be necessary to construct crossings. This could change stream flow patterns for short distances downstream of the crossing. Accidental spills, during construction and operation, could introduce contaminants into streams. However, spills are unlikely due to expected reduction in derailments and compliance with regulatory procedures for handling, storing, and disposing of potential contaminants. Long-term impacts would include the potential alteration of stream banks and stream beds due to construction of stream crossings, potentially changing drainage patterns, stream flow velocities and flood plain characteristics. The presence of the proposed rail line could also act as a dam resulting in changes to surface drainage patterns along the rail line.

Alternative B-4: Bypass for all Rail Traffic

Impacts associated with the construction and operation of Alternative B-4 would be the same as those presented for the bypass segment of Alternative B-3.

4.9.5.2 Wetlands

Alternative B-1: No-Action

Approximately 5.8 acres of wetlands, the majority of which (5.0 acres) are palustrine emergent wetlands, are present within the existing rail line right-of-way. Much of these wetlands are directly adjacent to the existing DM&E rail line. It is likely that these wetlands occur in the drainage ditches adjacent to the rail bed. The rail bed would be considered partially responsible for the existence of these wetlands by acting as a dam for surface water run-off. While these wetlands provide wildlife habitat and other wetland features, they are not anticipated to be considered jurisdictional wetlands by the Corps of Engineers. There is also approximately 0.1 acre of palustrine aquatic bed wetlands, and approximately 0.7 acre of palustrine forested wetlands. These wetlands could be impacted by the existing rail line in the unlikely event of an accidental fuel or chemical spill. However, no significant change is expected due to the continued operation and maintenance of the existing rail line.

Alternative B-2: Existing Rail Line

Approximately 5.8 acres of wetlands, as described for Alternative B-1, were identified within the existing right-of-way for Alternative B-2. Reconstruction activities within the existing right-of-way would cause a disturbance or loss of these areas. As described in Section 4.3.7.3, impacts to wetlands would vary depending on the nature of the reconstruction activity. Heavy equipment may be required to drive through wetland areas causing damage to sensitive wetland vegetation and soils. Potential cut and fill activities necessary for any siding construction could lead to the total loss of wetlands in some areas within the existing rail line right-of-way. Rehabilitation of rail bed drainage ditches would also likely result in the loss of most, if not all the existing wetlands within the right-of-way.

Wetlands adjacent to the rail line right-of-way could experience increased sedimentation from erosion of the right-of-way. Restoration of drainage in the right-of-way could result in adjacent wetlands also being drained and lost. Should construction activities be required outside the existing DM&E right-of-way, adjacent wetlands could experience soil disturbance and damage to existing vegetation.

Impacts to wetlands within the existing right-of-way, during operation and maintenance of the railroad, would not be expected. Most of these right-of-way wetlands would be lost. However, adjacent wetlands could be affected. In the unlikely event of a chemical spill, run-off of chemicals, such as herbicides, lubricants, and fuel that may be present from activities occurring within the right-of-way, could result in contamination. The limited quantity of chemicals transported by DM&E, improvement in rail safety, and compliance with regulatory procedures for handling, storing, and disposing of potential contaminants would make such an event unlikely. Over time, some wetlands would be expected to reestablish in the drainage ditches along the rail line.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Impacts to wetlands adjacent to the existing rail line portion of this alternative would be the same as described for Alternative B-1.

Approximately 5.1 acres of wetlands would be lost within the right-of-way for the Brookings bypass alignment. This would include approximately 4.2 acres of palustrine emergent wetlands, 0.1 acre of palustrine aquatic bed wetlands, and approximately 0.7 acre of palustrine forested wetlands. Wetlands within the proposed right-of-way would most likely be lost from construction of a raised rail bed and drainage systems for the new rail bed. The loss of wetlands would include a loss of their beneficial characteristics, such as flood control, wildlife habitat, ground water recharge, storm water storage, and water purification. Portions of wetlands in areas adjacent to the proposed rail line could be degraded during construction due to increased run-off and sedimentation. Adjacent wetlands could also be lost if right-of-way drainage also drains these areas. Fuels, lubricants, and herbicides could potentially cause contamination in wetlands in the event of an accidental spill. The limited quantity of chemicals transported by DM&E,

improvement in rail safety, and compliance with regulatory procedures for handling, storing, and disposing of potential contaminants would make such an event unlikely.

The raised rail bed would likely act as a dam for surface run-off and could provide conditions suitable for the reestablishment of wetland communities in drainage ditches along the proposed right-of-way. Any wetlands reestablishing within the right-of-way would likely be subject to periodic disturbance from activities designed to restore or maintain rail bed drainage.

Alternative B-4: Bypass for all Rail Traffic

Impacts associated with the construction and operation of Alternative B-4 would be the same as those presented for the bypass segment of Alternative B-3.

4.9.5.3 Groundwater

Since there are no activities described within the proposed project that involve subsurface alterations, the potential of affecting ground water would most likely be insignificant for the areas described for the alternatives proposed for the City of Brookings. However, in the event of an accidental spill of hazardous materials, leaching of hazardous substances could potentially contaminate groundwater. Since the transport of hazardous materials by DM&E is negligible, the potential of a spill occurring would be very insignificant. Contamination could result from an accidental spill of fuel or oil during maintenance or operation of trains along the proposed rail line. However, spills would be unlikely due to improved track conditions and compliance with regulatory procedures for handling, storing, and disposing of potential contaminants.

4.9.6 AIR QUALITY

The potential for affects to air quality would be similar for each of the Brookings action alternative. The amount of emissions during reconstruction and construction is relative to the type of activity and the length of the alternative. New construction would have greater emissions than reconstruction of existing rail line due to more heavy equipment, particularly for earthwork, greater ground disturbance, and longer time necessary to complete the work. Longer alternatives would have greater emissions during operation due to increased fuel consumption. Emissions from motor vehicles waiting at grade crossings could also contribute to local air quality effects during operation of the rail line. Air quality impacts were calculated according to the methodology presented in Appendix E. Table 4.9-1 presents gross-ton miles for each alternative. Operational impacts for designated levels of rail traffic are presented in Table 4.9-2. SEA also examined the issue of fugitive coal dust and exposure to diesel locomotive emissions. These are discussed in more detail in Section 3.2.8.

Table 4.9-1
Brookings Alternatives
Alternative Operations Data

Alternative	Length (miles)	Fuel Fac. GTM*/gallon	Number of Trains	tons/year	GTM
B-1	13.0	993.8	3 trains	8,817,165	117,268,294.5
B-2	13.0	993.8	11 trains 21 trains 37 trains	32,329,605 72,067,118 134,539,615	429,983,746.5 958,492,669.0 1,789,376,879.5
B-3	27.5	993.8	11 trains 21 trains 37 trains	32,329,605 72,067,118 137,587,275	458,198,674.5 1,032,618,848.0 1,937,734,076.0
B-4	14.5	993.8	11 trains 21 trains 37 trains	32,329,605 72,067,118 137,587,275	468,779,272.5 1,044,973,211.0 1,950,824,417.5

* Gross-ton miles

Alternative B-1: No-Action

This alternative would require continued operation of approximately 13.3 miles of existing DM&E rail line. No reconstruction or construction impacts would occur. Train traffic on the existing DM&E rail line would continue to operate at slow speeds, and train emissions would remain the same. The additional operational impact of motor vehicle emissions at crossings, would remain at the current level.

Alternative B-2: Existing Rail Line

During reconstruction of approximately 13.3 miles of the existing rail line through Brookings, road closures and rerouted traffic could result in more emissions from motor vehicles if they result in congested areas along detour routes and delays at crossings. Increased dust and vehicle emissions would be produced by reconstruction activities. Trains delayed during construction would potentially increase emissions in the area they are stopped.

Operational impacts for designated levels of rail traffic are presented in Table 4.9-2. The types of potential air quality impacts anticipated during rail line operation are discussed in Section 4.3.8. SEA determined that none of the existing grade crossings met the threshold for analysis of emissions from delayed vehicles. These emissions were therefore not quantified. However, an increase in the number of trains passing through the area would increase the overall amount of locomotive emissions and could increase vehicle emissions due to a greater number of delay events. Depending on the scheduling of train traffic, an increase in emission amounts could result from the increased frequency of vehicle delays at grade crossings. However, an overall decrease in emissions concentrations could be expected due to the improved track condition allowing for an increase in train speeds. Trains would pass through the area more quickly and the number of vehicles and their delay time at intersections would be decreased. Less emission would therefore occur per train passing event, with these emissions dispersing following each train event and not building up to concentrations of concern. Additionally, under certain conditions, such as high winds, fugitive coal dust could result from transport of coal along the existing rail line. Fugitive coal dust, while likely an inconvenience, is not anticipated to be substantial, as discussed in Section 4.3.8.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Impacts associated with the continued operation of the existing rail line are described under Alternative B-1.

The bypass segment of Alternative B-3 would be constructed around the north side of Brookings and would involve the most new construction. Approximately 322.4 acres of ground would be disturbed for construction of the bypass. Ground disturbance and earthwork could result in fugitive dust. Emissions from construction equipment would also add to air emissions.

During rail line operation, locomotive traffic on the new rail line would contribute emissions to the airshed along the rail line. The estimated amount of pollutants produced during operation by this alternative, under operating levels of 20 MNT (8 coal trains), 50 MNT (18 coal trains), and 100 MNT (34 coal trains), are presented in Table 4.9-2. Additional impacts would include increased emissions from vehicles delayed at grade crossings during train passing events in areas where such emissions do not presently occur. SEA determined that vehicle delays at proposed grade crossings along the bypass route would not meet thresholds requiring these emissions be quantified. All occur in generally rural areas with little vehicle traffic and good air quality. Additionally, fugitive coal dust could occur along the new rail line but the rural nature of the area and limited amount would result in it going largely unnoticed.

Alternative B-4: Bypass for All Rail Traffic

Impacts associated with the construction and operation of Alternative B-4 would be the same as those presented for the bypass segment of Alternative B-3.

Table 4.9-2
Brookings Alternatives
Emissions Levels of Proposed Alternatives

Alternative	Number of Trains	Emissions Levels											
		HC		CO		NO_X		SO_2		PM_{10}		Pb	
		Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
B-1	3 trains	N/A	100	N/A	100	N/A	100	N/A	100	N/A	100	N/A	0.6
B-2	11 trains 21 trains 37 trains	3.47 9.28 18.40	100	9.30 24.89 49.40	100	57.89 **150.81** **296.89**	100	5.82 15.58 30.92	100	2.35 6.27 12.45	100	0.000191 0.000510 0.001011	0.6
B-3	11 trains 21 trains 37 trains	3.78 10.09 20.03	100	10.13 27.08 53.78	100	62.85 **163.84** **322.97**	100	6.34 17.58 33.66	100	2.56 6.82 13.55	100	0.000208 0.000554 0.001101	0.6
B-4	11 trains 21 trains 37 trains	3.90 10.22 20.17	100	10.44 27.44 54.17	100	64.71 **166.01** **325.27**	100	6.54 17.17 33.90	100	2.63 6.92 13.65	100	0.000214 0.000562 0.001109	0.6

HC - Hydrocarbons; CO - Carbon Monoxide; NO_X - Oxides of Nitrogen
SO_2 - Sulfur Dioxide; PM_{10} - Particulate Matter; Pb - Lead

4.9.7 NOISE AND VIBRATION

4.9.7.1 Noise

The construction, reconstruction, and operation of each of the Brookings alternatives would result in increased noise levels. Section 4.3.9 provides a description of noise sources associated with rail line construction and operation, such as construction equipment, wayside noise, and locomotive horn sounding. SEA determined that train traffic on each of the Brookings action alternatives would meet thresholds for noise analysis. SEA calculated the distance (contour) from the rail line at which the average daily noise level (L_{dn}) would be equal to 65 audible noise decibels (dBA) and 70 dBA during project operation, as discussed in Section 4.3.9. This distance was calculated for the existing level of railroad traffic for Alternative B-1, as well as the proposed levels of railroad traffic for the proposed action alternatives.

Alternative B-1: No-Action

No construction related noise changes would occur as a result of this alternative. The total number of noise sensitive receptors exposed to average daily noise levels from train operations of 65 dBA and 70 dBA would remain at 545 and 354 respectively (Table 4.9-3).

Alternative B-2: Existing Rail Line

Increased noise would occur during reconstruction and operation along the existing rail line for Alternative B-2. A description of impacts, such as noise created by construction machinery and the duration of construction activities is presented in Section 4.3.9. The number of noise sensitive receptors that would be affected by noise, during operation of Alternative B-2, would increase as rail traffic increases. Tables 4.9-3 and 4.9-4 show the number of noise sensitive receptors that would be exposed to average daily noise levels of 65 dBA and 70 dBA at the levels of rail line operation evaluated.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Noise impacts along the existing rail line would be consistent with those described for Alternative B-1.

Increased noise levels would occur during construction and operation of the bypass segment of this alternative. Machinery used for construction activities, such as grading, rail installation, and site preparation would produce noise during construction of the project, as described in Section 4.3.9. Blasting, if necessary for cut excavation, would also contribute to noise levels. Few noise sensitive receptors would be exposed to these increases due the rural nature of the area.

During operation of the proposed rail line, rail traffic along the bypass alignment would increase noise level exposure to noise sensitive receptors along the proposed rail line. The sparsely populated rural setting in which the proposed bypass would be built would limit the number of noise sensitive receptors exposed to average daily noise levels of 65 dBA and 70 dBA during rail line operation. The number of potential noise sensitive receptors along Alternative B-3 are presented in Tables 4.9-5 thru 4.9-7.

Alternative B-4: Bypass for all Rail Traffic

Noise impacts associated with the construction and operation of Alternative B-4 would be the same as those presented for the bypass segment of Alternative B-3. During operation of Alternative B-4, noise impacts would be slightly greater than for the new rail line portion of Alternative B-3 due to a greater number of trains operating over Alternative B-4. As shown in Table 4.9-8, the sparsely populated, rural setting in which the proposed bypass would be built results in a few noise sensitive receptors being exposed to increased noise levels.

Table 4.9-3
Brookings Alternatives
Number of Noise Sensitive Receptors at 65 dBA L_{dn} for Alternatives B-1*and B-2

County and Community Along Existing Line Segment	Number of Noise Sensitive Receptors at 65 dBA Ldn			
	Wayside	Wayside/Horn	Horn	Total
Existing Condition*				
Brookings	**0***	**25***	**520***	**545***
Brookings	0*	24*	397*	421*
Volga	0*	1*	121*	122*
11 trains (20 MNT)				
Brookings	**0**	**140**	**1,067**	**1,207**
Brookings	0	126	880	1,006
Volga	0	13	184	197
21 trains (50 MNT)				
Brookings	**0**	**273**	**1,443**	**1,716**
Brookings	0	226	1,218	1,444
Volga	0	45	221	266

Table 4.9-3
Brookings Alternatives
Number of Noise Sensitive Receptors at 65 dBA L_{dn} for Alternatives B-1*and B-2

County and Community Along Existing Line Segment	Number of Noise Sensitive Receptors at 65 dBA Ldn			
	Wayside	Wayside/Horn	Horn	Total
37 trains (100 MNT)				
Brookings	**0**	**448**	**1,855**	**2,303**
Brookings	0	352	1,548	1,900
Volga	0	94	300	394
*total for existing rail line at current level of operation under Alternative B-1, B-2, and B-3				

Table 4.9-4
Brookings Alternatives
Number of Noise Sensitive Receptors at 70 dBA L_{dn} for Alternatives B-1*and B-2

County and Community Along Existing Line Segment	Number of Noise Sensitive Receptors at 70 dBA L_{dn}			
	Wayside	Wayside/Horn	Horn	Total
Existing Condition*				
Brookings	**0***	**3***	**351***	**354***
Brookings	0*	3*	292*	295*
Volga	0*	0*	57*	57*
11 trains (20 MNT)				
Brookings	**0**	**28**	**491**	**519**
Brookings	0	28	379	407
Volga	0	0	110	110
21 trains (50 MNT)				
Brookings	**0**	**113**	**735**	**848**
Brookings	0	111	577	688
Volga	0	2	157	159
37 trains (100 MNT)				
Brookings	**0**	**151**	**1,170**	**1,321**
Brookings	0	129	969	1,098
Volga	0	21	197	218

Table 4.9-5
Brookings Alternatives
Number of Noise Sensitive Receptors for Alternative B-3

City	Number of Trains	Number of Noise Sensitive Receptors at 65 dBA L_{dn}/70 dBA L_{dn}			
		Wayside	Wayside/Horn	Horn	Total
Brookings	8 trains	0 / 0	2 / 2	4 / 2	6 / 4
	18 trains	0 / 0	2 / 2	10 / 3	12 / 5
	34 trains	0 / 0	3 / 2	13 / 8	16 / 10

Table 4.9-6
Brookings Alternatives
Number of Noise Sensitive Receptors at 65 dBA L_{dn} for Alternative B-3

City	Number of Trains	Noise Sensitive Receptors at 65 dBA L_{dn}								
		Wayside			Wayside w Horn			Horn		
		E	B	BR	E	B	BR	E	B	BR
Brookings	11 trains	0	0	0	140	5	2	1,067	8	319
	21 trains	0	0	0	273	5	2	1,443	14	325
	37 trains	0	1	0	448	6	3	1,855	18	328

E=all traffic on existing line B= all traffic on bypass
BR=coal traffic (8 trains) on bypass with remaining traffic (3 trains) on existing rail line

Table 4.9-7
Brookings Alternatives
Number of Noise Sensitive Receptors at 70 dBA L_{dn} for Alternative B-3

City	Number of Trains	Noise Sensitive Receptors at 70 dBA L_{dn}								
		Wayside			Wayside/Horn			Horn		
		E	B	BR	E	B	BR	E	B	BR
Brookings	11 trains	0	0	0	28	2	2	491	5	133
	21 trains	0	0	0	113	2	2	735	7	134
	37 trains	0	1	0	151	4	2	1,170	10	139

E=all traffic on existing line B= all traffic on bypass
BR=coal traffic (8 trains) on bypass with remaining traffic (3 trains) on existing rail line

Table 4.9-8
Brookings Alternatives
Number of Noise Sensitive Receptors for Alternative B-4

Number of Trains	Noise Sensitive Receptors at 65 dBA L_{dn}/70 dBA L_{dn}			
	Wayside	Wayside/Horn	Horn	Total
11 trains	0/0	5/2	8/5	13/7
21 trains	0/0	5/2	14/7	19/9
37 trains	1/0	6/4	18/10	25/14

Based on its analysis, SEA determined Alternative B-2 would have a significant increase in noise sensitive receptors exposed to adverse noise levels. Alternatives B-3 and B-4 would also expose noise sensitive receptors to adverse noise levels, although the rural nature of the area along the bypass greatly reduces the number that would be exposed.

4.9.7.2 Vibration

Structures along the proposed alternatives could experience varying degrees of vibration and different levels of impact, as discussed in Section 4.3.9.2. Those within 100 feet of the rail line are most likely to experience potential structural damage. Beyond 100 feet, the only potential effects would be to hospitals or other facilities with sensitive equipment. Increased vibration could cause such equipment to function improperly. Structures beyond 100 feet would not likely be structurally damaged. However, vibration may be felt and cause concern or annoyance.

Alternative B-1: No-Action

There are 6 houses located within 100 feet of the existing rail line. There are 117 houses located between 101 and 200 feet of the existing rail line, and 203 houses within 201 and 400 feet of the existing rail line (Table 4.9-9). The level of vibration created by the existing DM&E rail traffic on the existing rail corridor would remain the same under Alternative B-1.

Alternative B-2: Existing Rail Line

The number of houses located within the specific ranges of the existing rail line is the same as for Alternative B-1. Houses built in proximity to the existing rail line may have structural fortification appropriate for the vibration levels generated by operation of a rail line. However, structures that are currently located in proximity of the existing rail line could experience an increase in vibration, based on DM&E's proposed transport of heavier loads at higher speeds. Structures within 100 feet of the existing DM&E rail line currently not experiencing damage from vibration could potentially be exposed to damaging levels under operation of unit coal trains over the existing rail line. No facilities were identified along the existing rail line with sensitive equipment close enough to potentially be affected by rail generated vibration.

Alternative B-3: Existing Rail Line and Bypass for coal Traffic

The number of structures that could potentially experience vibration from this alternative is provided in Table 4.9-9. Impacts for structures along the existing rail line (6 within 100 feet) would be the same as those presented for Alternative B-1. Unlike houses built in proximity to the existing rail line, houses built in the area along the bypass (2 within 100 feet) may not contain the structural fortifications appropriate for the vibration levels generated by operation of a rail line. Therefore, these residences, especially those within 100 feet of the proposed new rail line, may be more susceptible to damage from vibration.

Beyond 100 feet, the only potential damaging affects would be to hospitals or other facilities with sensitive equipment. Increased vibration could cause such equipment to function improperly. There are no hospitals, or other facilities known to contain sensitive equipment, located within 1.0 mile of the proposed bypass corridor. At this distance, no impacts from vibration would be expected.

Alternative B-4: Bypass for all Rail Traffic

Impacts associated with the construction and operation of Alternative B-4 would be the same as those presented for the bypass segment of Alternative B-3.

Table 4.9-9
Number of Structures Potentially Impacted by Vibration

Alternative	0-100 feet	101-200 feet	201-400 feet	Total
B-1	6	117	203	326
B-2	6	117	203	326
B-3	8	117	205	330
B-4	2	0	2	4

4.9.8 BIOLOGICAL RESOURCES

The existing biological resources within the project area are described in Section 4.1.8. The following discusses the potential impacts to these resources due to the various Brookings alternatives. The distances measured adjacent to the existing rail line are miles totaled from both sides of the existing track. The distance of land presented for the proposed new rail line bypass, includes land that would be converted from its present condition to railroad right-of-way.

4.9.8.1 Vegetation

Alternative B-1: No-Action

The No-Action Alternative would have no impacts to vegetation other than the minimal trimming, mowing, and herbicide control that currently occurs within the existing rail corridor as part of normal rail line operation and maintenance.

Alternative B-2: Existing Rail Line

The existing corridor in Brookings is adjacent to approximately 5.6 miles of grassland, 1.3 miles of wooded fence rows, 1.3 miles of wetlands, and approximately 10.2 miles of agricultural land. Impacts would primarily occur within the existing rail line right-of-way. Impacts to these communities would likely include clearing or damage from construction equipment, loss due to herbicide use, trimming and mowing, and ground disturbance. Soil disturbance during construction could allow the introduction of non-native or undesirable species within the project area. Following completion of construction, the edge of the proposed right-of-way would be expected to revegetate as described in Section 4.3.10.1.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Impacts associated with the existing portion of this alternative would be the same as those described for Alternative B-1.

Construction activities associated with the development of the proposed bypass segment could cause temporary and permanent impacts to vegetation. Construction of the proposed bypass segment would require the conversion of 89.6 acres of grassland and 9.7 acres of wooded fence rows to railroad right-of-way. Woody vegetation and grasses would be cleared or disturbed during construction. Conversion of approximately 284.8 acres of agricultural land to railroad right-of-way could cause loss of crops, if planted prior to construction. Approximately 5.1 acres of wetland vegetation would also be lost. Disturbance of soils could cause the loss of native plant communities within the disturbed area. Impacts associated with construction and operation of the proposed rail line, such as soil loss due to erosion and the introduction of non-native and undesirable species, where vegetation and surface soils are disturbed, are presented in Section 4.3.10. Potential spills of hazardous substances used during construction and operation of the proposed rail line may affect vegetative communities both within the right-of-way and in adjacent areas.

Following completion of construction, the edge of the proposed right-of-way would be expected to revegetate as described in Section 4.3.10.1. These areas would be maintained by DM&E, and could require mowing and trimming to control excess growth of ground cover and woody vegetation. The use of herbicides to control weeds during operation of the proposed rail line could affect adjacent vegetative communities by killing or damaging vegetation that may be exposed to herbicides.

Alternative B-4: Bypass for all Rail Traffic

Impacts from Alternative B-4 would be the same as those described for the bypass portion of Alternative B-3.

4.9.8.2 Wildlife

The types and species of wildlife found within each project area are described in Section 4.1.8.2.

Alternative B-1: No-Action

Impacts to wildlife that currently inhabit the existing rail corridor would remain at existing levels under Alternative B-1. Wildlife inhabiting the area have likely adapted to some extent to the existing rail traffic. Additionally, much of this existing corridor, approximately 13.3 miles, is through developed areas that would tend to have only limited types and numbers of wildlife present.

Alternative B-2: Existing Rail Line

Wildlife using habitat along the existing rail line have become habituated to activities associated with rail line traffic. However, short-term and long-term impacts are anticipated during reconstruction and operation of the existing rail line. Reconstruction and operational impacts, as presented in Section 4.3.11, may include habitat loss, increased noise, train-wildlife collisions, increased human presence and the potential introduction of contaminants into the environment. Increased rail traffic and train speed would increase disturbance to wildlife and potential mortality to individuals using the rail line right-of-way.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Impacts associated with the existing rail line would be consistent with impacts described for Alternative B-1.

During construction of the bypass segment of this alternative, vegetation within the proposed bypass corridor would be cleared or disturbed, decreasing habitat for wildlife species. The loss of approximately 284.8 acres of agricultural land would require wildlife using the area for cover and forage to relocate to nearby areas during construction. Wildlife utilizing the woody vegetation located within approximately 9.7 acres of wooded fence rows within the proposed right-of-way would lose this habitat. Loss of approximately 5.1 acres of wetland habitat would reduce this habitat for wildlife that use it, including waterfowl, some species of upland birds, amphibians, songbirds, and reptiles. These species would be displaced during construction and would need to find other suitable habitat. Construction of the rail line could cause the loss of ground nests and nesting adult birds. Wildlife would lose nesting, foraging, and cover habitat, and be presented with the obstacle of crossing a rail line where none previously existed.

During operation, additional impacts could include increased noise disturbance and mortality to wildlife. Some species could abandon habitats in the adjacent areas due to disturbance created by passing trains. Loss due to collisions with trains would increase, as suggested in Section 4.3.11, for deer and other animals that may cross the proposed rail line or use it as a travel path.

Alternative B-4: Bypass for all Rail Traffic

Impacts associated with the construction and operation of Alternative B-4 would be the same as those presented for the bypass segment of Alternative B-3.

4.9.8.3 Aquatic and Fisheries

Trout streams are present throughout the South Dakota project area. These streams are an important element of South Dakota's natural history as well as a source of recreation. Impacts to surface waters could include introduction of increased sediment from construction run-off, changes in the hydrology due to channelization and stream bank stabilization, and loss of suitable stream habitat. These impacts would be a for all fishery resources, but particularly for trout streams due to trout having less tolerance for these types of impacts than warm water fish species. Any impact to a trout stream would be considered significant, as would permanent impacts to important warm water fisheries. However, there are no trout streams crossed by any of the Brookings alternatives.

Alternative B-1: No-Action

There are 12 waterbody crossings by the existing DM&E rail line, including one of the Big Sioux River. This alternative would have no impact on these resources as it would not involve any construction or reconstruction activities. The only impact would be the minimal potential for a spill of contaminants in the unlikely event of a train derailment.

Alternative B-2: Existing Rail Line

The existing DM&E rail line through Brookings crosses the Big Sioux River, a perennial water body, and 11 other waterbodies. Potential impacts to aquatic organisms, such as alteration of available habitat and abrasion of gills due to increased sediment, are described in Section 4.3.11.4. During reconstruction of the existing rail line, these would potentially occur primarily in the Big Sioux River, as aquatic resources in intermittent streams would be limited. In areas where sediment is deposited, the development of eggs and larvae of aquatic organisms could be disrupted. Changes in hydrology could result in a change in the natural movements and migrations of aquatic populations or the loss of habitat for some species. The abundance of food resources may also be reduced. Instream bridge or culvert activities would damage fish habitat and mussel beds if they are present at the crossing site. Accidental spills of contaminants such as oil, lubricants, and fuel during reconstruction and operation could pose a hazard to fish and mussels if these materials enter waterways in sufficient quantities to significantly reduce water quality.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

No significant impacts are expected to occur along the existing rail line due to the continued operation and maintenance practices on the existing rail line. Impacts expected to occur along the existing rail line for this alternative are the same as those described for Alternative B-1.

The proposed rail line around Brookings would cross 1 perennial stream (the Big Sioux River) and approximately 19 intermittent or seasonal streams. Impacts to aquatic resources would occur primarily from the crossing of the Big Sioux River. Impacts to the Big Sioux River would be similar to those of Alternative B-2, as both alternatives would involve installation of a new bridge.

Alternative B-4: Bypass for all Rail Traffic

Impacts associated with this alternative would be the same as those described for the bypass segment of Alternative B-3.

4.9.8.4 Endangered, Threatened, and Sensitive Species

A list of threatened and endangered species within the South Dakota project area is provided in Section 4.1.8.4. Of these, only the Federally endangered Topeka shiner would potentially be impacted by the Brookings alternatives.

Alternative B-1: No-Action

The existing DM&E rail line through Brookings crosses four streams where the Topeka shiner is known to occur. The streams are located in the Big Sioux River basin. They include Deer Creek, North Deer Creek, Sixmile Creek, and an unnamed Big Sioux River tributary. Since no change in current activities would occur with this alternative, no change in impacts are expected. No construction or reconstruction affects, except those that would be part of normal rail line maintenance, would occur. However, continued deterioration of the existing rail line increases the risk of accidental spills occurring in sensitive habitats. Should a spill of contaminants occur as a result of a derailment and contaminants enter streams inhabited by

Topeka shiners, downstream populations could be at risk. Loss of individual shiners or local populations would be a significant impact on the species.

Alternative B-2: Existing Rail Line

The existing DM&E rail line through Brookings crosses four streams where the Topeka shiner is known to occur, as noted above under Alternative B-1. Increased sedimentation due to erosion and in-stream work where the rail line crosses inhabitated streams could affect downstream populations of Topeka shiners. Silt-free areas are utilized by the Topeka shiner for spawning. Sediment could reduce habitat and forage, as well as harm individuals. Channelization of streams, if necessary, at crossings could negatively impact many aquatic species, including the Topeka shiner, by eliminating and degrading instream habitats, altering the natural hydrography, and changing water quality. Channelization could also cause the elimination of pool habitats, and decrease instream debris and woody riparian vegetation. Water velocities may increase and deep silt may be deposited on downstream substrates where water velocities return to normal. This potential increase in sedimentation may increase organic nutrients, resulting in a decrease of dissolved oxygen from decomposition of these materials. Although the Topeka shiner can tolerate some degree of short-term degradations, they could be affected if these conditions are created by reconstruction.

Reconstruction of stream crossings and operation of a railroad would provide the potential opportunity for spills of contaminants or herbicides to enter streams, as discussed in Section 4.9.1.9.3. Reduced water quality from contaminants could harm individuals, reduce population sizes, or eliminate populations downstream of where the spill enters the waterway, causing significant impacts to the species.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Impacts resulting from the continued operation and maintenance of the existing rail line for this alternative are the same as those described for Alternative B-1.

The proposed bypass route would cross the same streams that are crossed by the existing route through Brookings. Potential impacts would be consistent with those described for Alternative B-2. Although no stream crossings currently exist at locations along the proposed bypass, installation of new stream crossings would have similar impacts to the removal and installation or reconstruction of the existing crossing structures along the existing rail line.

Alternative B-4: Bypass for all Rail Traffic

Impacts associated with this alternative would be the same as those described for the bypass portion of Alternative B-3.

4.9.9 TRANSPORTATION

The types of impacts to transportation in the Brookings area, resulting from the reconstruction or construction of any of the action alternatives, would be similar to those described in Section 4.3.12. Potential impacts would include traffic delays for motorists and rail traffic, detours, and inconvenience for pedestrians and vehicles crossing the rail line.

To determine the potential operational impacts to transportation, SEA calculated potential changes in vehicle delay at crossings where average daily traffic (ADT) volumes were 5,000 or greater as discussed in more detail in Section 4.3.12.

Alternative B-1: No-Action

Under Alternative B-1, no changes in the existing transportation environment would occur. Rail traffic and operating speeds would remain at the present level. Traffic delays at 18 grade crossings (Table 4.1-15), along the existing rail line, would remain unchanged. Alternative B-1 has 3 crossings where the ADT is 5,000 or greater. The grade separated crossing at Interstate 29/US Highway 71 would not be upgraded.

Alternative B-2: Existing Rail Line

Alternative B-2 would cross 18 roads, highways, and city streets grade (Table 4.1-15). All roadways crossed could experience impacts related to reconstruction similar to those described in Section 4.3.12, such as traffic delays, reduced access, and rerouted traffic.

Alternative B-2 would have 3 crossings where the ADT is 5,000 vehicles per day or greater. During operation, impacts to transportation would include delays to vehicles at grade crossings. While individual train events would result in shorter delays due to increased train speeds, more trains would result in a greater number of delay events for motorists and pedestrians, making it more likely they could encounter a train. The following summarizes SEA's delay analysis for those crossing with ADTs over 5,000 vehicles per day by level of rail traffic.

20 MNT

There are 3 public crossings in Brookings with ADT's above 5,000 (22nd Avenue -FRA crossing 197478H, MP 289.30; Medary Avenue - FRA crossings 197480J, MP 290.30; Main Avenue - FRA crossing 197481R, MP 290.90) for which SEA performed vehicle delay calculations. All 3 crossings would experience a reduction in delay per stopped vehicle ranging from 1.8 to 1.4 minutes. The level of service following reconstruction of the existing rail line would be A for both train length scenarios. These crossings would also experience a reduction in maximum vehicle queue length, from 19.7 to 13.4, from 19.9 to 13.6, and 12.4 to 8.5, respectively.

50 MNT

All 3 public crossings analyzed in Brookings County would experience a reduction in delay per stopped vehicle ranging from 1.8 to 1.4 minutes. The levels of service following rail line reconstruction would be B for 22nd Avenue (FRA crossing 197478H, MP 289.30) for both the 6,400 foot and 7,400 foot train lengths. The level of service at Medary Avenue (FRA crossings 197480J, milepost 290.30) and Main Avenue (FRA crossing 197481R, milepost 290.90) would be A for both train length scenarios. All these crossings would also experience a reduction in maximum vehicle queue length, from 19.7 to 13.4, from 19.9 to 13.6, and 12.4 to 8.5, respectively.

100 MNT

All 3 public crossings analyzed would experience a reduction in delay per stopped vehicle ranging from 1.8 to 1.4. The levels of service for each reconstructed crossing would be B for the 6,400 feet train scenario and C for the 7,400 feet scenario. These crossings would also experience a reduction in maximum vehicle queue length from 19.7 to 13.4, from 19.9 to 13.6, and 12.4 to 8.5, respectively.

The reconstruction of DM&E's existing rail line proposed under Alternative B-2 would likely result in improved rail transportation service, reliability and efficiency. Rail shippers throughout South Dakota would benefit from these improvements, as would rail shippers located in the Brookings area (Section 4.9.1.4.3).

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Along the existing DM&E rail line, 18 roadways have grade crossings within the Brookings project area. Impacts along the existing rail line would be the same as those described for Alternative B-1.

The proposed bypass segment would cross 16 roadways, including Interstate Highway 29 (I-29), 3 county roads and highways, and 12 city streets or avenues in the Brookings area. The proposed crossings would experience traffic delays and detours during construction of the grade crossings. Long-term impacts would include vehicle delays during train events. The Brookings bypass does not have any crossings where ADT volumes are 5,000 vehicles per day or greater. SEA concluded that the potential effect of increased train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and that vehicular delay would be minimal. However, the bypass would require construction of a new grade separated crossing at I-29 north of Brookings. Construction of this crossing could result in traffic delays for interstate travelers due to lane reductions, detours, or temporary closures to allow for construction over the interstate.

Alternative B-3 would provide a new rail line over which future unit coal trains would operate. This route, combined with the reconstruction of other portions of the DM&E rail line, would provide an improved and efficient rail transportation route for coal. However, existing rail traffic, including through-trains and trains servicing Brookings' area shippers, would be unable to realize the full benefit of reconstruction of these other portions of rail line due to the existing rail line through Brookings not being reconstructed. These trains would continue to operate over the existing rail line, under current speed and weight restrictions.

Speed restrictions would reduce train cycle times, but only slightly due to the short distance under speed restriction. Trains operating at slower speeds along this stretch of rail line could also complicate rail operations as passing siding locations are determined based on operating speeds of 49 mph (westbound) and 45 mph (eastbound). The combination of slower trains on the existing rail line and faster trains on the bypass would require careful attention to avoid unnecessary train delay and potentially dangerous situations for trains on this and other portions of the rail system. Such complications would be particularly apparent if a train were required to stop and wait either along the bypass or existing line, blocking roadways, in order to provide for safe passage of other trains. Should mistakes be made, two trains could risk operating on the same stretch of line in opposite directions or in the same direction with a train slowing to enter the existing portion of the Brookings' rail line while a faster train approaches from behind to operate over the bypass.

Rail car weight restrictions on this portion of the rail line would dictate the maximum allowable weight for all cars operating on the entire system that would be required to use this section of the existing rail line. It would be inefficient, if not impractical, to transfer loads from one rail car to others to "top them off" after they had passed through Brookings. This would prevent shippers whose cars must pass through Brookings from upgrading railcar loads from the current 263,000 pound restriction to the industry standard 286,000 pounds. Therefore existing shippers would not recognize the efficiencies associated with rebuilding the entire line, or be able to ship loads comparable to their competitor on other rail lines.

In addition, the bypass route would cross DM&E's Sioux Valley spur, a rail line connecting the DM&E mainline to the South Dakota/Dakota Cement Plant. The cement plant is the only shipper served by this spur. The spur is used to queue and store rail cars for loading and unloading. Construction of the bypass across this spur would make this process infeasible as insufficient space would be available between the plant and the bypass to store an entire train. A train loading or unloading at the plant would be required to stop across the bypass, be moved back and forth, instead of in only one direction, to facilitate complete loading or unloading of the train, or be split into smaller trains in the Sioux Valley yard and then reassembled in the yard. Because of these existing operational processes, construction and operation of the Brookings bypass would require additional rail spur construction to provide sufficient space for trains, or the plant and DM&E would be required to implement less efficient procedures. This would increase loading and unloading times and rail transportation costs for this shipper.

Alternative B-4: Bypass for all Rail Traffic

The transportation impacts of Alternative B-4 for vehicles would be similar to those described for the bypass portion of Alternative B-3. However, delay incidents would be increased by three per day due to the addition of the existing DM&E rail traffic over the bypass. Because all train traffic would travel over the bypass, the inefficiencies related to continued operation of trains over the existing rail line would not result. However, the access problems described for the South Dakota/Dakota Cement Plant would still occur.

4.9.10 SAFETY

Any of the proposed alternatives present potential safety hazards for motorists at grade crossings and pedestrians at designated crossings and along the rail line. As discussed in Section 4.3.13, safety impacts could occur as a result of reconstruction of the rail line. During reconstruction and construction, impacts would include increased traffic and congestion on roadways due to road closings, transportation of materials and crews to work sites reducing road safety. Impacts would also include accelerated wear and tear on roadways due to the operation of heavy trucks to move materials and machinery, also making roads potentially more hazardous to travel. Routes for emergency vehicles may need to be redesigned to avoid delays at congested or closed crossings. Pedestrians would alsobe required to modify their routing to avoid hazards in construction areas.

During operation, the increases in rail traffic could impact safety within the Brookings area. Trains traveling on the existing rail line present a safety hazard for impatient motorists who may try to beat a train at a grade crossing to avoid the delay created by the passing train. Improvements to the existing rail line may decrease the time a motorist would be delayed. However, the increased frequency of trains in the area would increase the likelihood of motorists and pedestrians encountering a train and the incidences of subsequent safety hazards for motorists and pedestrians at grade crossings. Increased train speeds on an improved rail line may create a safety hazard to those who might underestimate the time needed for the train to reach the location at which they choose to cross the track. The risk of derailments and resultant loss or damage of cargo, damage to vehicles, and rail equipment associated with them would be decreased by the improved conditions of the rail line.

To evaluate the significance of potential changes in accident frequency for the Brookings Alternatives, SEA categorized highway/railroad grade crossings into two categories. Category A consisted of highway/railroad grade crossings with a history of relatively frequent train-vehicle accidents. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates at or above the state's 50th highest accident frequency rate of 1 accident every 20 years (0.051067 accident frequency rate) to be Category A highway/railroad grade crossings. For all Category A highway/railroad grade crossings, SEA considered the relatively small accident frequency rate increase of 1 accident every 100 years (a 0.01 accident frequency rate increase) to be significant.

Category B consisted of highway/railroad grade crossings with a history of relatively infrequent train-vehicle accidents. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates less than 1 accident every 20 years (less than 0.051067 accident frequency rate) to be Category B highway/rail grade crossings. For these crossings, SEA considered an accident frequency rate increase of 1 accident every 20 years (a 0.05 accident frequency rate increase) to be significant. The results of this analysis are discussed for each alternative.

Alternative B-1: No-Action

Safety issues related to construction, reconstruction, and increased rail operation would not be experienced as a result of this alternative. Grade crossing safety would remain at the current level. However, the operational safety of the existing traffic on the existing rail line would continue to present potential risk. Lack of upgrades along the existing DM&E rail line may potentially increase the potential for train accidents. The grade separated road crossing at Interstate 29/US Highway 71 would not be upgraded.

Alternative B-2: Existing Rail Line

Reconstruction of the existing rail line through Brookings would result in safety impacts similar to those described in Section 4.3.13. Pedestrian safety could be of concern with this alternative due to its proximity to developed areas and public facilities. It would be within approximately 900 feet of the nearest church and approximately 1,000 feet of the nearest school. There are 522 houses located within 500 feet of the existing rail line right-of-way. This setting places a large number of persons and vehicles in proximity of the rail line. Impacts to pedestrians and motorists would include reduced access and the presence of large construction equipment which could be potential safety hazards.

The nearest hospital is approximately 2,700 feet from the existing rail line. The safety of emergency vehicles and their clients during an emergency event would require establishment of routes that would reduce and minimize delay by construction activities or operating trains at crossings used for access across the rail line.

A bike path, along the west side of Interstate 29/US Highway 71, and 2 pedestrian walkways, located between 17th Avenue and Medary Avenue, cross the existing rail line grade, creating safety concerns for pedestrians and cyclists using these pathways. As described in Section 4.3.17, operational impacts to trail safety would tend to be concentrated at grade crossings. Potential delays during construction and operation could cause unsafe conditions for pedestrians and cyclists. Those inconvenienced by detours could cross at unprotected crossings, walk along the rail line right-of-way, or cross at unauthorized locations.

Rail safety along the reconstructed rail line would be expected to improve. The potential for derailments and crossing incidents would be reduced.

SEA evaluated the potential for accidents at grade crossings for Alternative B-2. The results of this analysis were the same for each of the Extension Alternatives (Alternatives B, C, and D). These results are presented below for each level of operation evaluated.

20MNT

SEA's safety analysis showed that for the 18 highway/railroad grade crossings affected by the reconstruction of the existing rail line for Alternative B-2, the predicted accident frequency at the 20 MNT level of operation would range from 0.001 to 0.005. This translates into a range of estimated accident frequency from 1 accident every 1,180 years to 1 accident every 198 years, respectively. SEA found these predicted rates to be below the criteria for significance.

An overall increase in the accident frequency would be observed for several of the grade crossings following reconstruction. The system-wide change in accident frequency in Brookings is 0.046. This represents a predicted increase of 1 accident every 22 years.

50 MNT

SEA's safety analysis showed that for the 18 highway/railroad grade crossings affected by the reconstruction and increased operation of the existing rail line as part of Alternative B-2, the predicted accident frequency at the 50 MNT level of operation would range from 0.002 to 0.026. This translates into a range of estimated accident frequency from 1 accident every 415 years to 1 accident every 38 years, respectively. SEA determined the predicted increases resulting from the reconstruction was significant for crossings at 22nd Ave (197478H, MP 289.30) and Main Ave (197481R, MP 290.90). These crossings are classified at Category A. SEA found the predicted rates at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the grade crossings along Alternative B-2. The system-wide change in accident frequency in Brookings is 0.167. This represents a predicted increase of 1 accident every 6 years.

100 MNT

SEA's safety analysis showed that for the 18 highway/railroad grade crossings affected by Alternative B-2, the predicted accident frequency at the 100 MNT level of operation would range from 0.006 to 0.045. This translates into a range of estimated accident frequency from 1 accident every 167 years to 1 accident every 22 years, respectively. SEA determined the predicted increases resulting from the reconstruction was significant for crossings at 22nd Ave (197478H, MP 289.30), Main Ave (197481R, MP 290.90), and Medary Ave (197480J, MP 290.30). These crossings are classified as Category A. SEA found the predicted rates at other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several of the grade crossings along Alternative B-2. The system-wide change in accident frequency in Brookings is 0.283. This represents a predicted increase of 1 accident every 4 years.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Safety concerns along the existing rail line would be the same as those described for Alternative B-1. SEA's safety analysis showed that for the 18 public highway/railroad grade crossings impacted by 3 trains per day on the existing rail line through Brookings, the predicted accident frequency at all levels of operation would range from 0.003 to 0.139. This translates into a range of estimated accident frequency from one accident every 333 years to one accident every 7 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at 22nd Avenue (FRA crossing 197478H, milepost 289.30). SEA found the predicted rates at the other locations to be below the criteria for significance.

The bypass segment would be constructed in a predominantly rural area. Safety concerns during construction would include detours and reduced access for pedestrians and motorists. The presence of large construction equipment and closed crossings would be temporary and limited to the area of construction. Proposed rail construction and operation could affect safety of motorists and school buses at proposed grade crossings. Impacts associated with school bus traffic at grade crossings are presented in Section 4.3.13. The number of school bus crossings at public grade crossings are presented in Table 4.9-10. The safety of emergency vehicles and their clients during an emergency event would require establishment of routes that would reduce or minimize the potential delay by construction activities or operating trains at crossings used for access.

SEA analysis of predicted accident frequency at new grade crossings along the bypass is discussed below by level of rail line traffic.

<u>20 MNT</u>

SEA's safety analysis showed that for the 16 additional public highway/railroad grade crossings required for the Brookings bypass, the predicted accident frequency at the 20 MNT level of operation would range from 0.004 to 0.05. This translates into a range of estimated annual accident frequency from 1 accident every 250 years to 1 accident every 20 years, respectively. SEA found these predicted rates to be below the criteria for significance.

50 MNT

SEA's safety analysis showed that for the 16 additional public highway/railroad grade crossings required for the Brookings bypass, the predicted accident frequency at the 50 MNT level of operation would range from 0.008 to 0.091. This translates into a range of estimated annual accident frequency from 1 accident every 125 years to 1 accident every 11 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at the crossings of US-14, CR 77, CR 9, CR 7 and CR 5. SEA found the predicted rates at the other locations to be below the criteria for significance.

100 MNT

SEA's safety analysis showed that for the 16 additional public highway/railroad grade crossings required for the Brookings bypass, the predicted accident frequency at the 100 MNT level of operation would range from 0.008 to 0.091. This translates into a range of estimated annual accident frequency from 1 accident every 125 years to 1 accident every 11 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at US-14, Landfill Road, CR 77, CR 9, CR 7 and CR 5. SEA found the predicted rates at the other locations to be below the criteria for significance.

Alternative B-4: Bypass for all Rail Traffic

Safety concerns would be the same as those described for the bypass segment of Alternative B-3. The increased number of trains along the bypass segment would create a change in the predicted accident frequency during operation. The predicted accident frequencies are described below.

20 MNT

SEA's safety analysis showed that for the 16 additional public highway/railroad grade crossings required for the Brookings bypass, the predicted accident frequency at the 20 MNT level of operation would range from 0.005 to 0.056. This translates into a range of estimated annual accident frequency from 1 accident every 200 years to 1 accident every 18 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at US-14 and CR 77. SEA found the predicted rates at the other locations to be below the criteria for significance.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.007 to 0.068. This translates into a range of estimated annual accident frequency from 1 accident every 143 years to 1 accident every 15 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at US-14, CR 77, CR 9, and CR 5. SEA found the predicted rates at the other locations to be below the criteria for significance.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.009 to 0.079. This translates into a range of estimated annual accident frequency from 1 accident every 111 years to 1 accident every 13 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at US-14, CR 77, CR 9, CR 7 and CR 5. SEA found the predicted rates at the other locations to be below the criteria for significance.

4.9.11 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

Alternative B-1: No-Action

No construction would occur as a result of this alternative. This alternative would not result in an increase in the types or amounts of hazardous materials being transported by DM&E. The likelihood of an accident involving hazardous materials is currently low due to the minimal quantities of such materials transported. However, the poor condition of DM&E's track increases the chances of derailment that could potentially release hazardous materials.

Alternative B-2: Existing Rail Line

Neither the reconstruction nor operation of this alternative would result in an increase in the type or amounts of hazardous materials being transported by DM&E. As stated in Section 4.3.14, the reconstruction of the existing rail line would likely further reduce the potential for an accident involving the release of hazardous substances by providing an improved, safer rail line. The likelihood of such an accident is currently low due to the minimal quantities of such materials transported.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Neither construction nor operation of this alternative would result in an increase in the types or amounts of hazardous materials currently transported by DM&E. The new rail line bypass would provide a safe route for the transport of coal. Train derailment on this portion of rail line would be unlikely. Should one occur, the only potential contaminants released would be diesel fuel and lubricants necessary for train operations. However, hazardous materials currently transported over the existing DM&E rail line would continue to be transported over the existing rail line in its existing condition. The poor condition of DM&E's existing track increases the chances of a derailment that could potentially release hazardous materials. However, the likelihood of such an accident is currently low due to minimal quantities of hazardous materials transported.

Table 4.9-10
School Bus Crossings for Brookings Alternatives

School District and Bus Service	Street Name	Number of Crossings/Day
Brookings, SD	**Bypass:**	
	475th Avenue	2
	213th Street	2
	US Highway 14 (Northwest of Aurora)	10
	473rd Avenue	4
	Co Road 77/471st Avenue	8
	470th Avenue	4
	Co Highway 9	2
	Co Highway 34	0
	Co Highway 5	0
	Co Highway 7	0

Table 4.9-10 School Bus Crossings for Brookings Alternatives		
School District and Bus Service	**Street Name**	**Number of Crossings/Day**
Brookings, SD *(continued)*	**Existing Rail Line:**	
	475th Avenue	2
	1st Street	0
	Main Avenue S.	3
	Medary Avenue	10
	Orchard Street	0
	2nd Street S.	0
	17th Avenue S.	25
	6th Avenue S.	17
	6th Street	0
	22nd Avenue	9
	US Highway 14 (West of Volga)	0
	Western Avenue	2

Alternative B-4: Bypass for all Rail Traffic

Transportation impacts would be the same as those described for Alternative B-3, except that existing hazardous materials traffic would be routed over the bypass. Therefore, this traffic would be operated over a rail line of improved condition, reducing the potential for a track-condition related derailment.

Hazardous Material Sites

Alternative B-1: No-Action

Because no construction or reconstruction would occur with this alternative, Alternative B-1 would have no impact on existing hazardous materials sites. Because of the condition of the existing rail line, the potential for a derailment would remain relatively high. Such a derailment could result in a spill of hazardous materials, resulting in a reportable spill and a new recorded hazardous materials site.

Alternative B-2: Existing Rail Line

As described in Section 4.3.14, hazardous material sites are places where release of hazardous materials have been reported to local, state, or Federal authorities. In Brookings County, 17 LUST sites (Table 4.1-21) were listed. No other sites were identified within Brookings County. If any of these sites are located within or adjacent to the proposed rail line right-of-way, appropriate action would be necessary to avoid disturbance of the site. There is the potential for railroad operations to result in new sites of contamination in the event of spills during derailments or improper handling of hazardous materials necessary for normal operations. However, this is unlikely due to the expected reduction in derailments from improved rail conditions and compliance with regulations regarding handling, storage, and disposal of hazardous materials.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Since this information is based on the county in which these alternatives are located, the information for hazardous material sites would be basically the same as that presented for Alternative B-2.

Alternative B-4: Bypass for all Rail Traffic

Impacts would be basically the same as those presented for Alternative B-2.

4.9.12 ENERGY RESOURCES

No change in the present impacts to energy resources would be expected with Alternative B-1. In Section 4.3.15, impacts related to the transport and utilization of energy resources are presented. Upgrading the existing DM&E rail line or construction of associated alternatives would result from DM&E successfully constructing a rail line extension into the PRB and obtaining contracts to transport coal from the basin to utilities throughout the midwest. This would provide a more cost-effective transportation route for PRB coal. It would help alleviate service and congestion problems, making the transportation of PRB coal more efficient and reliable. Energy resources would be available to users at a more economical rate with higher reliability and greater efficiency. The shorter route proposed by DM&E would result in significant diesel fuel savings for the transportation of PRB coal. Because the existing rail line is slightly shorter than the bypass, Alternative B-2 would provide the more fuel efficient routing for existing and future rail traffic.

4.9.13 CULTURAL RESOURCES

An investigation of the South Dakota archaeological records for the proposed alternatives showed no sites located along the existing rail line in the Brookings area. However, two sites were identified within the proposed bypass right-of-way. One site (39BK41) is a historic artifact scatter and the other site (39BK37) is an artifact scatter with no known cultural affiliation. Neither site is considered eligible for listing on the NRHP. However, as discussed in Sections 4.3.15 and 4.4.17, unknown cultural resources could be encountered during reconstruction and construction activities and be damaged or destroyed. Because of previous disturbance within the existing rail line right-of-way, reconstruction activities are considered by SEA to have limited potential to contain undisturbed cultural resources of significance. However, significant cultural resources yet unknown and undisturbed could occur along the alignment for the bypass, particularly where it would cross the Big Sioux River.

4.9.14 SOCIOECONOMICS

Alternative B-1: No-Action

Provided DM&E remained a viable railroad, there would be no change in the social or economic characteristics of the Brookings area from this alternative. No new jobs would be created and tax revenues would remain the same. However, if denial of the project results in DM&E ceasing to operate, several hundred persons throughout Brookings and the surrounding area would loss their jobs and potentially relocate from the area for employment elsewhere.

Alternative B-2: Existing Rail Line

The population and demographics for South Dakota are presented in Section 4.1.14.1. Within Brookings County, the unemployment rate was reported at 2.7 percent in 1996. Construction activities along the DM&E rail line would create 62 two-year jobs directly associated with the railroad and an estimated 30 jobs indirectly associated with the railroad obtaining contracts to transport coal from the basin to utilities throughout the midwest. This would provide a more cost-effective transportation route for PRB coal. It would help alleviate service and congestion problems, making the transportation of PRB coal more efficient and reliable. Energy resources would be available to users at a more economical rate with higher reliability and greater efficiency. The shorter route proposed by DM&E would result in significant diesel fuel savings for the transportation of PRB coal. Because the existing rail line is slightly shorter than the bypass, Alternative B-2 would provide the more fuel efficient routing for existing and future rail traffic.

4.9.13 CULTURAL RESOURCES

An investigation of the South Dakota archaeological records for the proposed alternatives showed no sites located along the existing rail line in the Brookings area. However, two sites were identified within the proposed bypass right-of-way. One site (39BK41) is a historic artifact scatter and the other site (39BK37) is an artifact scatter with no known cultural affiliation. Neither site is considered eligible for listing on the NRHP. However, as discussed in Sections 4.3.15 and 4.4.17, unknown cultural resources could be encountered during reconstruction and construction activities and be damaged or destroyed. Because of previous disturbance within the existing rail line right-of-way, reconstruction activities are considered by SEA to have limited potential to contain undisturbed cultural resources of significance. However, significant cultural resources yet unknown and undisturbed could occur along the alignment for the bypass, particularly where it would cross the Big Sioux River.

4.9.14 SOCIOECONOMICS

Alternative B-1: No-Action

Provided DM&E remained a viable railroad, there would be no change in the social or economic characteristics of the Brookings area from this alternative. No new jobs would be created and tax revenues would remain the same. However, if denial of the project results in DM&E ceasing to operate, several hundred persons throughout Brookings and the surrounding area would loss their jobs and potentially relocate from the area for employment elsewhere.

Alternative B-2: Existing Rail Line

The population and demographics for South Dakota are presented in Section 4.1.14.1. Within Brookings County, the unemployment rate was reported at 2.7 percent in 1996. Construction activities along the DM&E rail line would create 62 two-year jobs directly associated with the railroad and an estimated 30 jobs indirectly associated with the railroad reconstruction activities (Table 4.3-20). Local and non-local workers could be hired to fill positions with the railroad. Economic and employment benefits, such as purchase of construction materials from local suppliers and use of local lodging and eating facilities, are described in Section 4.3.17. Non-local construction workers would not likely relocate permanently to this community. However, the community would benefit from the income spent by these workers while located in the area. Income from railroad construction work would total an estimated $9.2 million county-wide. This would generate an estimated $1.0 million in sales and use taxes (Table 4.3-23) some of which would be available to the county. Additional workers moving to the area due to obtaining permanent rail related jobs would increase the demand for housing, potentially balancing any negative impact the increase in rail traffic would have to real estate in proximity to the rail line. Property improvements made to the DM&E rail line could provide an estimated $1.3 million increase in property taxes for Brookings County.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Since socioeconomic information is based on the county in which these alternatives are located and the extent of reconstruction or construction activity, the information for socioeconomics would be basically the same as that presented for Alternative B-2. Actual monetary amounts may be greater for this alternative due to construction taking longer than reconstruction and including slightly more (1.2 miles) length of rail line. Land values may increase along the proposed bypass segment if land is attractive to commercial or industrial developers.

Alternative B-4: Bypass for all Rail Traffic

Socioeconomic impacts from construction and operation of Alternative B-4 would be similar to those discussed for Alternative B-3.

4.9.15 ENVIRONMENTAL JUSTICE

Nine census block groups in Brookings along the existing DM&E rail line were determined by SEA to meet the criteria for classification as environmental justice, as discussed in Section 4.3.17. All the census block groups were classified as environmental justice due to having a percentage of persons in the census block group at or below the poverty level that was 10 percent or more than the percentage for Brookings County.

SEA evaluated the impacts of the proposed increases in rail traffic to these environmental justice census block groups and compared these impacts to the impacts expected to non-environmental justice census block groups. SEA's analysis determined that 3 of the census block groups potentially containing environmental justice communities would experience disproportionate impacts due to increased noise. Disproportionate impacts would occur to 1 census block group at the 20 MNT level of operation and all three census block groups at the 50 MNT and 100 MNT levels.

In addition, SEA determined 3 environmental justice census block groups would be disproportionately impacted for grade crossing safety due to grade crossings at 22nd Avenue (crossing 197478H, MP 289.30), Main Avenue (crossing 197481R, MP 290.90), and Medary Avenue (crossing 197480J, MP 290.30) within the census block groups calculated to experience an increased accident frequency meeting SEA's criteria for significant impact. These impacts would occur at the 50 MNT level of rail traffic for 22nd and Main Avenues, and for all 3 crossings at the 100 MNT level of traffic. All 3 census block groups would be affected by the Medary Avenue crossing. The 22nd Avenue crossing would affect 1 census block group and the Main Avenue crossing would affect 2 census block groups. One of the census block groups affected by the Main Avenue crossing was also calculated to be disproportionately impacted by increased noise levels at all 3 levels of rail operation. The census block group affected by the 22nd Avenue crossing was also calculated to be disproportionately impacted by increased noise levels at the 50 MNT and 100 MNT levels of rail operation.

SEA also analyzed census block groups to determine if any environmental census block groups would be disproportionately impacted by the proposed rail line reconstruction and increased levels of operation due to being adversely impacted by more than one evaluation criteria (noise, safety, air, transportation, etc). SEA's analysis did not identify any environmental justice census block groups that would be adversely impacted by more than one evaluation criteria. Therefore, no disproportionate impacts would be borne by environmental justice communities due to being adversely affected by multiple impact categories.

No census block groups meeting the criteria for classification as environmental justice communities were identified along the proposed new rail bypass alignment considered for Alternatives B-3 and B-4. Construction and operation of either of these alternatives would have no impact on environmental justice communities.

4.9.16 RECREATION

Alternative B-1: No-Action

There are a limited number of recreational opportunities in the areas adjacent to the existing rail line and the proposed bypass. There are 3 parks located within a mile of the existing rail line. The closest of these is Lions Park, located adjacent to the existing rail in Brookings.

Lions Park has a basketball court, play ground equipment, and picnic facilities. Pioneer Park, located approximately 600 feet north of the existing rail line, is the location of the annual Brookings Summer Arts Festival. Hillcrest Park is approximately 0.5 mile north of the existing rail line. It contains facilities for swimming, tennis and racquetball. A non-motorized access exercise course, along the west side of Interstate 29/US Highway 71, and 2 pedestrian walkways, between 17th Avenue and Medary Avenue, cross the existing rail line. Rail related impacts to these facilities would remain at their current level under this alternative.

Alternative B-2: Existing Rail Line

The recreational facilities and activities described for Alternative B-1 would be the same for this alternative. Reconstruction activities along the existing rail line could impact the quality of activities at these facilities due to increased dust, noise, and access, delay, and safety concerns for motorists and pedestrians. During operation, participants along the non-motorized access exercise course and pedestrian walkways could be inconvenienced by increased numbers of trains passing through the area which could cause delays in traveling the course and safety concerns for those crossing the tracks. Those using park facilities could experience an increased frequency of noise disturbance due to the increase in railroad traffic through the area. Users of the parks may also have concerns regarding access and safety if traveling over the rail line moving to or from the parks. Only those in proximity of the grade crossings would be affected by these conditions while using these facilities.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

Conditions along the existing rail line would remain relatively the same. No changes in conditions or rail traffic would occur. No impacts would occur along the existing rail line.

Recreation located in the area along the proposed bypass would include fishing and canoeing on the Big Sioux River and hunting in the fields along the alignment. The types of recreational impacts that could potentially occur would be similar to those described in Section 4.1.16. Construction and operation of the proposed bypass could affect the quality of certain recreational experiences such as hiking, camping, fishing, and hunting. A 14-acre camping facility, operated by the South Dakota Assembly of the Church of God, could be affected by the presence of the proposed bypass rail line. Church camp facilities are used occasionally for youth activities, and for a summer camp during the month of July. Increased dust and noise from construction and operation could displace recreational users from the immediate vicinity of the proposed rail line as well as disturb users throughout the area. Due to the sporadic nature and short-term use of these facilities, impacts are not expected to be significant.

Alternative B-4: Bypass for all Rail Traffic

Impacts during construction and operation would be the same as those described for the bypass segment of Alternative B-3.

4.9.17 AESTHETICS

Wild and Scenic Rivers

There are no wild and scenic rivers within the area described for the reconstruction project or the new build project. None would be impacted by any of the proposed alternatives.

Viewsheds/Scenic Values

Alternative B-1: No- Action

Alternative B-1 would have no impact on the scenic value of the project area. However, the presence of a deteriorating rail line could contribute to the perception of the area as unkept and dilapidated.

Alternative B-2: Existing Rail Line

The source of visual distraction created during reconstruction of the project would largely be limited to the proposed right-of-way and would include ground and vegetation disturbance and the presence of heavy equipment. The visual impacts created during construction would also reach beyond the proposed rail line right-of-way and likely be noticed from adjacent areas, such as residences, trails, and parks. Operational impacts to scenic values would result from the installation of the proposed rail line, bridges, and culverts. These structures would likely be more noticeable due to the lack of weathering. However, the reconstructed rail line and the presence of rail traffic would be consistent with the current visual nature of the area for this alternative. Alternative B-2 would result in an upgrade of the existing rail corridor and existing DM&E rail line. The proposed clean-up of the area and installation of new rail material would help to improve the current visual nature of the area from one of a dilapidated industrial corridor.

Alternative B-3: Existing Rail Line and Bypass for Coal Traffic

The impacts along the existing DM&E rail line would be the same as those presented for Alternative B-1.

Impacts to the scenic value of the project area are difficult to quantify. Since there are no railroads currently in the project area of the proposed bypass segment, the scenery of the area along the new rail line portion of Alternative B-3 would change. The construction process would likely create a temporary detraction from the existing landscape by clearing vegetation and soil disturbance. The operation of the alternative would forever change the composition of the surrounding countryside by the addition of a visible linear corridor. However, visual impacts are not necessarily negative. There are numerous clubs and organizations dedicated to the hobby of train watching. What may be perceived as a visual detraction to some could in fact be desirable to others. In addition, numerous roadways cris-cross the project area. The bypass segment of Alternative B-3 would add another such corridor. While no established scenic areas would be impacted, the relatively undeveloped Big Sioux River valley and surrounding farmlands present a scenic value. This would be changed by construction and operation of the new rail line portion of Alternative B-3.

Alternative B-4: Approval of Bypass for all Rail Traffic

Impacts due to construction and operation of Alternative B-4 would be the same as those described for the bypass segment of Alternative B-3.

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4.10 RECONSTRUCTION STAGING AND MARSHALING YARDS

The impacts created from the construction and operation of the various rail yards are described in this section. Should the No-Action Alternative be chosen, the impacts described for Alternatives B, C and D would not occur. Impacts are based on the conversion of the present land use at the proposed yard location to railroad right-of-way. Because of operational conflicts, rail yards may be located in different locations depending on the alternative selected for rail line expansion. Rail yard locations for one alternative may not be feasible for another alternative. Therefore, rail yards are discussed based on their proposed locations for each Extension Alternative. When a proposed rail yard location is the same for more than one alternative, this is indicated. A summary of impacts for each yard is presented in tabular form at the end of each alternative.

4.10.1 PRB EXTENSION - ALTERNATIVE B

4.10.1.1 Central Staging and Marshaling Yards and Shops

4.10.1.1.1 Location

The Central Staging and Marshaling Yards and Shops (Central Yard) would begin approximately 0.3 mile west of Cavour, South Dakota and end approximately 1.0 mile east of Huron, South Dakota. It would be located between mile posts 354.3 and 359.7 on both sides of the existing rail line. The yard would be 5.4 miles in length and 1,000 feet in width, with a total area of approximately 654.5 acres.

4.10.1.1.2 Geology and Soils

The proposed yard between Cavour and Huron would be constructed in an area containing deposits of glacial till. The dominant soil type is Houdek-Prosper loam. This soil has moderate permeability and high available water capacity. The slope of the soil generally ranges from 0-6 percent with average top soil depths of 7 to 10 inches. The soils are moderately erodible and easily blown away by the wind. No prime farmland was identified within the proposed rail yard boundaries. Impacts during construction could include increased erosion and loss of top soil within the proposed rail yard site and any disturbed adjacent areas. Soils would be graded and covered with rail beds, gravel, concrete, and asphalt. Based on the soil type, the proposed yard site should be graded to shed water, and the base material should be strengthened to support vehicular and rail traffic. During operation, run-off from the yard or redirected surface water, due to impermeable surfaces and structures within the rail yard, could cause increased erosion in surrounding areas.

4.10.1.1.3 Land Use

Agriculture

Approximately 585.7 acres, within the proposed rail yard, is agricultural land. No prime farmland was identified within the proposed yard site. The land use would be changed and lost for agricultural production through conversion to a rail yard.

Residential

Approximately 2.4 acres of residential land is present within the proposed rail yard site. There are two residences located within the proposed yard site. This land would be acquired by the railroad and converted to railroad use. The buildings would be removed or converted for railroad use. There are 7 residences located within 500 feet of the proposed rail yard boundary. These consist of rural farmsteads. Impacts to these residences, during construction could include noise, dust, increased road traffic, and vehicle delays associated with the movement of construction equipment and road closures on area roadways. These impacts would be temporary during construction of the proposed rail yard. Nearby residences would experience increased noise and inconvenience from road closure during operation of the proposed rail yard.

Commercial

The sewage treatment lagoons for Cavour are located approximately 200 feet southeast of the proposed rail yard location. The sewage lagoons for the City of Huron are located approximately 1,000 feet southwest of the proposed rail yard location. Construction and operation of the proposed rail yard would not be expected to affect these facilities. No commercial property is located within the proposed rail yard boundary. There are no businesses located within 500 feet of the proposed rail yard boundary.

4.10.1.1.4 Water Resources

Surface Water

There are three intermittent streams located within the proposed rail yard site. These would require possible realignment or channelization. There are also three stock ponds located within the proposed yard boundary. These ponds would likely be drained and filled during construction of the proposed rail yard. Impacts to surface water, as described in Section 3.2.7.1, could include an increase in water velocity due to channelization and stream bank stabilization, scouring and erosion of streams, and potential contamination from hazardous substances washing from the yard site during rain fall events. Changes in the ground surface, created by the presence of the proposed rail yard, could alter surface drainage to adjacent waterways.

Wetlands

Approximately 66.4 acres of wetlands are located within the proposed rail yard boundary much of which is a part of the USFWS wetland easement program. There are approximately 60.1 acres of palustrine emergent wetlands and approximately 6.3 acres of palustrine aquatic bed wetlands. Construction of the Central Yard would likely result in the total loss of these wetlands. Loss would result from draining or filling of these wetlands. Impacts to adjacent wetlands are discussed in Section 3.2.7.2, including increased sedimentation and changes in hydrology.

Groundwater

The construction of the proposed rail yard should not result in significant impacts to groundwater. However, possible contamination could result from a spill of hazardous substances during construction or operation of the proposed yard. During operation of the proposed yard, small spills of fuel and lubricants could occur that could accumulate over time, resulting in impacts to groundwater. Spills are unlikely, due to expected reduction in derailments and compliance with regulatory procedures for handling, storing and disposing of potential contaminants.

4.10.1.1.5 Air

Construction and operation activities associated with the Central Yard could create local impacts to air quality. During construction, approximately 654.5 acres of ground would experience varying degrees of disturbance which could be a source of fugitive dust. Construction equipment such as graders and earth movers would be a source of emissions while operating. While more concentrated and occurring for a longer period, these emissions would be similar to emissions and fugitive dust generated from current agricultural use of the yard site. Construction related affects to air quality would be limited to the period of yard construction. Vehicle emissions from motorists delayed during yard construction would not occur as the only roads affected by this yard have low ADTs (Section 4.10.1.1.8) and would be permanently closed and traffic rerouted.

Locomotive emissions would be the primary source of air quality impacts from the Central Yard. This yard would serve as the center of DM&E's operations and maintenance. Locomotives would spend approximately 3.0 hours at a time idling at this yard (10 locomotives idling at the shop could spend 6 hours of time idling). It will serve as the primary locomotive refueling center. Escaping fumes during refueling could contribute to air quality impacts. SEA has calculated air quality impacts due to the operation of the yard according to the methodology presented in Appendix E. Table 4.10-1 presents the amount of emissions from locomotive activities under the 20 MNT (11 trains per day), 50 MNT (21 trains per day), and 100 MNT (37 trains per day) operating scenarios.

Table 4.10-1
Emission Levels of Proposed Central Staging & Marshaling Yard and Shops

Operating Level	HC		CO		NO_x		SO_2		PM_{10}		Pb	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
20 MNT (11 trains per day)	18.81	78.99	51.22	215.11	268.09	1125.97	32.21	139.49	12.80	53.78	1.04E-03	0.00436944
20 MNT (with 10 locomotives idling at shop)	11.40	47.87	31.04	130.37	162.48	682.41	20.13	84.54	7.76	32.59	6.31E-04	0.00264815
50 MNT (21 trains per day)	39.90	150.79	97.78	410.67	511.81	2149.58	63.40	266.29	24.44	102.67	1.99E-03	0.00834167
50 MNT (with 10 locomotives idling at shop)	11.40	47.87	31.04	130.37	162.48	682.41	20.13	84.54	7.76	35.59	6.31E-04	0.00264815
100 MNT (37 trains per day)	63.26	265.68	172.28	723.56	901.75	3787.36	111.71	469.18	43.07	180.89	3.50E-03	0.01469722
100 MNT (with 10 locomotives idling at shop)	11.40	47.87	31.04	130.37	162.48	682.41	20.13	84.54	7.76	32.59	6.31E-04	0.00264815

4.10.1.1.6 Noise

Noise impacts would be present during construction and operation of the proposed Central Yard. Noise associated with construction activities would be temporary, generally occurring only during grading, site preparation and installation of yard facilities. The majority of construction noise produced would be from heavy equipment and vehicles. The duration of yard construction is expected to last for one to two construction seasons, generally extending from April 1 through November 1. Although the activities and noise associated with construction would be temporary, they could occur around the clock under certain conditions.

During operation, noise is generated by a variety of sources in a rail yard. Idling and operating locomotives, retarders, pumps, coupling and uncoupling of rail cars all contribute to noise. However, these sources are scattered throughout the yard; reducing the magnitude of noise by spreading it over a greater distance. Although potential noise impacts occur over a greater area, they are of less magnitude than if concentrated in one location. Additionally, noise sources at rail yards are generally within the interior of the yard, providing an area between the noise sources and the rail yard boundary in which noise can begin to decrease. This further reduces the potential noise impacts to areas adjacent to the rail yard.

While proposed rail yard locations have been determined for each alternative, the location of yard tracks and other equipment is unavailable. Modeling to determine potential noise impacts requires the location of noise generation equipment. Therefore, noise contours could not be generated for rail yards. Because of the usual scattered nature of noise sources and their location within the interior of the proposed yards, SEA conservatively determined noise sensitive receptors within 500 feet of the rail yard boundary would be those most likely impacted. There are 7 noise sensitive receptors located within 500 feet of the proposed rail yard (Table 4.10-2). These receptors would potentially experience increased noise levels due to operation of the proposed rail yard.

Table 4.10-2
Noise Sensitive Receptors Located within 500 Feet of Proposed Central Staging and Marshaling Yard and Shops

Distance from Rail Yard	Location	Number of Noise Sensitive Receptors
0-100 feet	north of existing rail line	2
101-200 feet	north of existing rail line	1
201-400 feet	1 - north of existing rail line 1 - south of existing rail line	2
401-500 feet	1 - north of existing rail line 1 - south of existing rail line	2

4.10.1.1.7 Biological Resources

Vegetation

Construction activities associated with the development of the proposed rail yard facilities could cause temporary and permanent impacts to vegetation. The conversion of approximately 585.7 acres of agricultural land to a rail yard facility could cause the loss of crops, if planted prior to construction. Approximately 66.4 acres of wetland vegetation would be lost or disturbed during construction of the proposed rail yard. Isolated patches of timber and woody shrubs including fence rows would be removed during construction. Woody vegetation and grasses that occur along the existing rail line would likely be cleared during construction due to the proposed Central Yard being on both sides of the rail line. Cropland would no longer be available for crop production. Impacts associated with the construction and operation of the proposed rail yard, such as soil loss due to erosion and the introduction of non-native or non-desirable species in buffer areas where vegetation and surface soils are disturbed, are presented in Section 4.3.10.1. In the unlikely event a hazardous substance would be spilled in the proposed site of the Central Yard, rapid clean-up would be necessary to protect local plants. Potential spills of hazardous substances used during construction or operation of the proposed rail yard may impact vegetative communities in adjacent areas.

Grasses and woody species would likely reestablish naturally, or through reseeding and planting in the outer areas and along fence lines of the proposed yard where rail facilities are absent. These areas would need to be maintained by mowing or trimming during operation to control excessive growth of ground cover and woody vegetation. If not administered correctly, herbicides used to control weeds could damage adjacent vegetative communities during operation of the proposed rail yard if herbicides drift or wash into these areas.

Wildlife

Wildlife using habitat in the proposed rail yard have become habituated to activities associated with the existing rail line. However, short-term and long-term impacts are anticipated during construction and operation of the proposed rail yard. Operational and construction impacts, as presented in Section 4.3.11 could include habitat loss, noise, train-wildlife collisions, increased human presence and the introduction of contaminants into the environment.

During construction, vegetation within the proposed rail yard would be cleared or disturbed, decreasing available habitat for wildlife species. Small mammals, reptiles and amphibians could experience an increase in mortality from train collisions in the Central Yard. All wildlife that currently utilize the area of the proposed rail yard would be displaced during construction. The loss of habitat due to construction would require wildlife using the area for cover and forage to relocate to nearby areas. Hunting and poaching pressure on local game populations could increase with increased human presence during construction in the area. Loss of wetlands within the proposed yard site would reduce waterfowl habitat. Because waterfowl are ground nesters, disturbance during nesting could result in destruction of nests and loss of nesting hens if nests were located within the proposed rail yard site. Wildlife that utilize the islolated parcels of woodlands and woody shrubs in fence rows would experience a loss of habitat when these vegetative resources are removed during construction.

During operation, impacts to wildlife would be primarily due to disturbance from yard activity. However, the level of activity and lack of habitat within the proposed rail yard would likely result in most wildlife seeking more secluded habitats. Impacts during operation could also include retention or filtration structures for run-off from the rail yard that may attract animals from surrounding wildlife communities, safety hazards to small animals that may enter the yard, and sporadic noise disturbance that may affect wildlife occupying adjacent habitats. The impacts to fish and mussels from rail yard operations would occur primarily from fuel and chemical spills, and herbicide applications to the right-of-way entering nearby waterways.

4.10.1.1.8 Transportation and Safety

SEA has determined that there are 5 roadways that currently pass through the proposed rail yard site. These roadways are 408th, 407th, 406th, 405th, and 404th avenues. All of these roadways have low traffic levels with none having ADTs over 45. It would be necessary to reroute or terminate these roadways prior to crossing the existing DM&E rail line or entering the proposed yard. During construction and operation of the proposed rail yard, road traffic would no longer have access through this area. Impacts associated with these road crossings, such as vehicle delays and the opportunity for accidents would no longer exist. Traffic rerouted to other roadways could increase the amount of traffic and safety concerns along other roadways and their grade crossings. However, the low number of vehicles on these roadways would likely cause little change to traffic on other roadways. Potential vehicle delays and reduced access of emergency vehicles could occur from closures and detours. Construction traffic on local roads could cause additional traffic delays, wear on local roads, and increased safety concerns.

4.10.1.1.9 Socioeconomics

During construction, approximately 89 two-year jobs may be created that are directly related to construction of the proposed rail yard. Jobs in the construction trades such as heavy equipment operators, carpenters, electricians and landscapers may be filled by local workers when available. Non-local workers could be used to fill shortages in construction positions and for actual rail construction activities. These workers would not likely locate permanently in the area. They would likely utilize temporary lodging, such as motels, hotels, rental property, recreational vehicle parks and campgrounds. These facilities are provided in the larger nearby communities of Huron and Wolsey.

The estimated earnings for workers would total approximately $12.3 million (Table 4.10-3). A portion of this income would likely be spent on local goods and services. Additional short-term employment opportunities may be created in the service areas due to this spending and demand for goods and services. A portion of the earnings from construction would also provide tax revenues of approximately $937,300 for the state and county.

Approximately 250-300 permanent rail jobs would be expected during the start-up of operations at this facility. At full operation, approximately 600 rail jobs would be provided. It is expected that these jobs would be filled by both local and non-local persons. With the 1.1 percent decrease in the population of Beadle County between 1986 and 1994 (Table 4.1-24), the influx of these workers and their families should not be a problem for the county to accommodate. Since the increase in employment represents less than 1 percent of the population of Beadle County, no significant impacts should occur related to the county's ability to maintain adequate services to its citizens.

With an estimated 2.6 percent unemployment rate (Table 4.3-20), workers within the county, searching for employment, would benefit from the presence of high paying railroad jobs. Employment opportunities are expected to increase and unemployment decrease throughout the area. Commercial lodging and eating facilities are expected to be utilized by rail crews and workers and no DM&E facilities are expected to be provided at this location. Facilities located in nearby communities, such as Cavour and Huron, could provide these services. An increase in support related jobs and contract jobs to fill these needs would be likely. Additional lodging and eating facilities could become established near the proposed yard site to provide convenient services to railroad workers. The potential increase in jobs could also provide additional tax revenues to the communities in surrounding areas and the county. Property taxes collected on new facilities would help Beadle County continue the services it provides, and possibly allow them to upgrade or increase what they currently provide.

Table 4.10-3
Estimated Earnings and Tax Revenues Generated During the Construction of Rail Yards on the South Dakota Reconstruction

Yard Location	Estimated Earnings	Tax Revenues generated
Central Staging and Marshaling Yards and Shops	$12,300,000	$937,300
Middle West Staging and Marshaling Yards and Shops	$3,800,000*	$309,200

*Estimated earnings for Middle West Yard based on figures from the Middle East yard which is similar in specification

4.10.1.1.10 Hazardous Materials

Neither construction nor operation of the proposed project would result in an increase in the types or amounts of hazardous materials currently transported by DM&E. Potential impacts during construction could include disturbance of hazardous material sites that may have been located within the proposed rail yard site. Prior to construction, DM&E would coordinate with the EPA, SDDEQ to determine if the proposed yard site had prior hazardous material contamination. This information would be included in the Phase 1 Environmental Site Assessment, which is used as a basis for determining contamination before acquiring a property. Searches of state and Federal databases, including RCRA, SHWS and CERCLIS-NFRAP were conducted to identify any listed contamination sites within a mile of the existing rail line. One CERCLIS site was listed for Beadle County. It is located at the DM&E Roundhouse in Huron, South Dakota. LUST and ERNS database searches investigated the area within 0.5 miles of the existing rail line. In Beadle County, 9 LUST sites and 2 Spill Notification Reports were identified. If any of these sites are located within the proposed yard location, appropriate action would be necessary to avoid disturbance of the sites.

During project operation, no impacts should occur to existing hazardous material sites. There would be a potential for spills resulting from derailments or improper handling of hazardous materials such as fuel, oil, and lubricants. Contamination from spills would be unlikely due to the expected reduction in derailments and required compliance with regulatory procedures regarding handling, storage, and disposal of hazardous substances.

4.10.1.1.11 Cultural Resources

There are no known cultural resources or historic sites located within the proposed rail yard. A survey of the area would be conducted to determine if any sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.10.1.2 New Wolsey BNSF Connections

4.10.1.2.1 Location

The New Wolsey BNSF Connection would be located between mile posts 373.9 and 376.3 within the town of Wolsey, South Dakota. It would extend east approximately 2.4 miles with a right-of-way of 200 feet. The new connection would cover an area of approximately 58.2 acres. Construction would occur within the existing right-of-way. Impacts would be similar to those for reconstruction of the existing rail line as described in Section 3.2.

4.10.1.2.2 Land Use

No agricultural land is present within the proposed connection site. There is no residential or commercial property located within the proposed rail line site. However, there are 21 residences and 11 businesses located within 500 feet of the proposed connection. The Omaha Home for Boys is located approximately 200 feet south of the proposed connection and the existing rail line. Impacts would include noise, dust, increased road traffic, vehicle delays during construction and operation of the proposed rail line connection.

4.10.1.2.3 Water Resources

There are approximately 9.8 acres of palustrine emergent wetlands located within the proposed connection site. Impacts would be similar to those presented in Section 4.10.1.1.4.

4.10.1.2.4 Noise

There are 21 noise sensitive receptors located within 500 feet of the proposed rail line connection. Impacts due to noise would be addressed under the reconstruction section for the rail line. Analysis of impacts are presented in Section 4.3.9.

4.10.1.2.5 Biological Resources

Construction activities would be expected to be confined to the existing right-of-way. No additional vegetation or habitat would be permanently altered. Disturbance of wildlife during construction would not be significant due to the presence of the existing rail line and development of the surrounding area. Disturbance in adjacent areas could occur during construction due to access needs of crews and construction equipment. Impacts would be temporary during construction.

4.10.1.2.6 Transportation and Safety

There are three roadways that cross the proposed rail line connection location. Impacts associated with the construction and operation of the proposed rail line connection could include temporary closure of crossings during construction activities, inconvenience to motorists, increased road traffic, vehicle delays, and increased safety concerns for motorists and pedestrians.

4.10.1.2.7 Socioeconomics

This location would serve as an interchange facility with the BNSF Railroad at Wolsey, South Dakota. No employees or facilities are expected to be located in this area. There would be no crew change at this location. No employees are expected to be based at this location.

Income earned by construction workers during installation of this facility would benefit the surrounding communities and county. Additional taxes would contribute to revenue for local, county and state programs and services.

4.10.1.2.8 Hazardous Materials

Hazardous material sites and impacts associated with construction and operation in Beadle County are presented in the Hazardous Materials section for the Middle East Staging and Marshaling Yards and Shops under Alternative D.

4.10.1.2.9 Cultural Resources

There are no known cultural resources or historical sites located within the proposed rail yard. A survey of the area would be conducted to determine if any sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.10.1.3 Middle West Staging and Marshaling Yard

4.10.1.3.1 Location

Under Alternative B, the Middle West Staging and Marshaling Yard (Middle West Yard) would begin approximately 6.0 miles west of Phillip, South Dakota and end approximately 3.0 miles east of Cottonwood, South Dakota. It would extend from mile post 567.5 to mile post 569.6. The proposed rail yard would be 2.1 miles in length with a width of 300 feet. The proposed rail yard site would cover an area of approximately 76.4 acres.

4.10.1.3.2 Geology and Soils

The proposed rail yard between the towns of Phillip and Cottonwood would be constructed in an area containing alluvium and clay with an underlying material of Pierre Shale. Absted silt loam and Kyle clay are the dominant soil types throughout the proposed rail yard site. Slope of the soil ranges from 0-3 percent within the proposed rail yard area. Average top soil depths range from 3 to 4 inches. Permeability is slow to very slow. No prime farmland was identified within the proposed rail yard location. Impacts during construction could include run-off during rain events and loss of top soil in the proposed rail yard site and any disturbed adjacent areas. Soil would be graded and covered with rail beds, gravel, concrete, and asphalt. During operation, run-off from the yard or redirected surface water, due to impermeable surfaces and structures within the rail yard, could cause increased erosion and areas of flooding during heavy rain events.

4.10.1.3.3 Land Use

<u>Agriculture</u>

Approximately 24.6 acres of cropland would be located within the proposed rail yard site. There would be approximately 50.8 acres of pasture or grassland within the proposed rail yard. No prime farmland identified within the proposed rail yard. Land use would be changed and lost for agricultural production through conversion to a rail yard.

Residential

No residential land was identified within the proposed rail yard site. There are no residences located within 500 feet of the proposed rail yard boundary. No impacts would likely occur to residential land at this proposed rail yard location.

Commercial

No commercial land was identified within the proposed rail yard site. There are no businesses located within 500 feet of the proposed rail yard boundary. No impacts would likely occur to commercial property at this proposed rail yard location.

4.10.1.3.4 Water Resources

Surface Water

There are no streams crossing the proposed rail yard site. Run-off from the proposed rail yard location could impact surface waters in adjacent areas. Changes in the ground surface created by the presence of the proposed rail yard could alter surface drainage to adjacent waterways. Potential contamination could occur due to hazardous substances that could wash from the proposed rail yard site during rain fall events.

Wetlands

Approximately 1.0 acre of emergent wetlands are located within the proposed rail yard site. These wetlands would likely be lost with the construction of the proposed rail yard. Loss would result from draining or filling these wetlands. Impacts to adjacent wetlands could include sedimentation, redistribution or loss of top soils, and change in hydrology.

Groundwater

Groundwater impacts would be similar to those described under Groundwater for the Central Staging and Marshaling Yards and Shops in Alternative B (Section 4.10.1.1.4).

4.10.1.3.5 Air

Construction and operation of the Middle West Yard could create local impacts to the air quality. During construction, approximately 76.4 acres of ground would experience disturbance which would create fugitive dust. Construction equipment would produce exhaust emissions while operating. While more concentrated and occurring for a longer period of time, these emissions and dust would be similar to what is currently generated by agricultural activity in the project area. Vehicle emissions from motorists delayed at grade crossing would not occur as the only road in the area of the proposed rail yard would be closed and traffic rerouted.

During operation of the Middle West Yard, locomotives would be the primary source of air quality impacts. During operation, each locomotive to use the yard would spend approximately 0.5 hour idling. Table 4.10-4 presents the amount of emissions from locomotive activities under the 20 MNT, 50MNT, and 100MNT operating scenarios.

Table 4.10-4
Emission Levels of Proposed Middle West Staging and Marshaling Yard

Operating Level	HC		CO		NO_x		SO_2		PM_{10}		Pb	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
20 MNT (11 trains per day)	3.13	13.16	8.54	35.85	44.68	187.66	5.54	23.25	2.13	8.96	1.73E-04	0.00072824
50 MNT (21 trains per day)	5.98	25.13	16.30	68.44	85.30	358.26	10.57	44.38	4.07	17.11	3.31E-04	0.00139028
100 MNT (37 trains per day)	10.54	44.28	28.71	120.59	150.29	631.23	18.86	76.2	7.18	30.15	5.83E-04	0.00244954

4.10.1.3.6 Noise

There are no noise sensitive receptors located within the proposed rail yard location. There are no noise sensitive receptors within 500 feet of the proposed rail yard boundary.

4.10.1.3.7 Biological Resources

Vegetation

Construction activities associated with the development of the proposed yard facilities could cause temporary and permanent impacts to vegetation. The conversion of approximately 24.6 acres of cropland could cause the loss of crops, if planted prior to construction. This cropland would no longer be available for crops. Approximately 50.8 acres of pasture or rangeland would be cleared of vegetation during construction. Approximately 1.0 acre of emergent wetland vegetation would also be lost or disturbed. Impacts associated with the construction and operation of the railroad, such as soil loss due to erosion and the introduction of non-native or non-desirable species in buffer areas where vegetation and surface soils would be disturbed, are presented in Section 3.2.10.1. Potential spills of hazardous substances used during construction of the proposed rail yard could impact vegetative communities in adjacent areas.

Grasses and woody species would likely reestablish naturally, or through reseeding and planting in the outer area and along fence lines of the proposed yard where rail facilities are absent. These areas would need to be maintained by mowing or trimming during operation to control excessive growth of ground cover and woody vegetation. Herbicides used to control weeds could impact adjacent vegetative communities during operation of the proposed rail yard.

Wildlife

Impacts for the Middle West facilities would be similar to those described for the Central Staging and Marshaling Yard and Shops. Operational and construction impacts, as presented in Section 3.2.11, may include habitat loss, noise, train-wildlife collisions, increased human presence and the introduction of contaminants into the environment.

4.10.1.3.8 Transportation and Safety

No public roadways cross the proposed rail yard location. One private road crosses the proposed rail yard location. It would be necessary to reroute or terminate this roadway prior to crossing the existing DM&E rail line or entering the proposed rail yard. During construction and operation of the proposed rail yard, traffic would no longer have access through this area.

Impacts associated with this private crossing, such as vehicle delay and the opportunity for accidents would no longer exist. Potential traffic delays, increased safety concerns and reduced access of emergency vehicles on local roadways could occur due to construction traffic on local roads. Construction traffic could also cause increased wear on local roads.

4.10.1.3.9 Socioeconomics

During construction, approximately 28 two-year jobs would be created that are directly related to construction of the proposed rail yard. Jobs in the construction trades such as heavy equipment operators, carpenters, electricians and landscapers may be filled by local workers when available. Non-local workers could be used to fill shortages in construction positions and for actual rail construction activities. These workers would not likely locate permanently in the area. They would likely utilize temporary lodging, such as motels, hotels, rental property, recreational vehicle parks and campgrounds in nearby communities including Wall, Phillip and Cottonwood.

The estimated earnings for workers would total approximately $3.8 million (Table 4.10-3). A portion of this income would likely be spent on local goods and services. Additional short-term employment opportunities may be created in service areas due to this spending and demand for goods and services. A portion of the earnings from construction would also provide tax revenues of approximately $309,200 for the state and county.

Approximately 20-30 permanent rail jobs would be expected during start-up of operations at this facility. At full operation, approximately 40-50 jobs would be provided. These jobs would be filled by local and non-local persons. With the -9.7 percent decrease in the population of Haakon County between 1986 and 1994 (Table 4.3-20), the influx of workers and their families should not be a problem for the county to accommodate. Although the increase in employment represents approximately 2 percent of the population of Haakon County, due to prior decreases in the county's population, no significant impacts should occur related to the county's ability to maintain adequate services to its citizens.

With an estimated 3.2 percent unemployment rate (Table 4.3-20), workers within the county, searching for employment, would benefit from the presence of high paying railroad jobs. Employment opportunities are expected to increase and unemployment decrease throughout the area. Commercial lodging and eating facilities are expected to be utilized by rail crews and workers and no DM&E facilities are expected to be provided at this location. Facilities located in nearby communities, such as Wall and Phillip, could provide these services. An increase in support related jobs and contract jobs to fill these needs would be likely. Additional lodging and eating facilities could become established near the proposed yard site to provide convenient services to railroad workers. The potential increase in jobs could also provide additional tax revenues to communities in surrounding areas and the county. Property taxes collected on new facilities would help Haakon County continue the services it provides, and possibly allow them to upgrade or increase what they currently provide.

4.10.1.3.10 Hazardous Materials

Neither construction nor operation of the proposed project would result in an increase in the types or amounts of hazardous materials currently transported by DM&E. Potential impacts during construction could include disturbance of hazardous material sites that may have been located within the proposed rail yard site. Searches of state and Federal databases, including RCRA, SHWS and CERCLIS-NFRAP were conducted to identify any listed contamination sites within a mile of the existing rail line. In Haakon County, two LUST sites were identified. If any sites are located within the proposed yard location, appropriate action would be necessary to avoid disturbance of the sites. Impacts due to construction and operation would be similar to those presented for Hazardous Materials under Central Staging and Marshaling Yard for Alternative B, Section 4.10.1.1.10.

4.10.1.3.11 Cultural Resources

There are no known cultural resources or historical sites located within the proposed rail yard. A survey of the area would be conducted to determine if any sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

Table 4.10-5
Current Land Use for Proposed Rail Yards
Located Along Alternative B

Yard	Agricultural (Acres)	Residential (Acres)	Commercial (Acres)
Central	585.7	2.4	0
Middle West	75.4	0	0

Table 4.10-6
Summary of Selected Impacts for Proposed Rail Yards Along Alternative B

Yard	Acres (approx.)	Prime Farmland	No. Of Streams	Acres of Wetlands	Noise Sensitive Receptors within 500 feet
Central	654.5	0	3	66.4	7
Middle West	76.4	0	0	1.0	0

Table 4.10-7
Roadways Impacted by Proposed Rail Yards in South Dakota along Alternative B

Yard and Roadways	Location	Average Daily Traffic
Central		
408 Avenue	Mile Post 354.8	15
407 Avenue	Mile Post 355.8	15
Co Highway 27	Mile Post 356.8	37
405 Avenue	Mile Post 357.8	44
404 Avenue	Mile Post 358.8	40

4.10.2 PRB EXTENSION - ALTERNATIVE C

4.10.2.1 Central Staging and Marshaling Yards

4.10.2.1.1 Location

Under Alternative C, the Central Staging and Marshaling Yard (Central Yard) would begin approximately 2.0 miles west of Huron, South Dakota and end approximately 4.0 miles east of Wolsey, South Dakota. It would be situated between mile posts 367.1 and 371.9, along the north side of the existing rail line. The yard would be 5.0 miles in length and 1,000 feet in width. The proposed rail yard would cover approximately 606.1 acres.

4.10.2.1.2 Geology and Soils

The proposed yard between Huron and Wolsey would be constructed in an area containing deposits of glacial till. The dominant soil type is Houdek-Prosper loam interspersed with small areas of Tetonka-Hoven silt loams. This soil has moderate permeability and high available water capacity. The slope of the soil generally ranges from 2-6 percent with an average top soil depth of approximately 7 inches. These soils are moderately erodible and easily blown away by the wind. No prime farmland was identified within the proposed rail yard boundary. Impacts to geology and soils would be similar to those presented for Geology and Soils in the Central Staging and Marshaling Yards under Alternative B (Section 4.10.1.1.2).

4.10.2.1.3 Land Use

Agriculture

The predominant land use is agriculture. Approximately 535.8 acres of cropland are located within the proposed rail yard. No prime farmland was identified within the proposed rail yard site. Land converted to use by the railroad would be lost for agricultural production.

Residential

No residential land was identified within the proposed rail yard site. There are no residences located within 500 feet of the proposed rail yard.

Commercial

No commercial land was identified within the proposed rail yard site. There are no businesses located within 500 feet of the proposed rail yard.

4.10.2.1.4 Water Resources

Surface Water

No streams are present within the area of the proposed rail yard. However, run-off from the proposed rail yard site, during construction and operation, could potentially cause an increase in sediment and plant material, and increase the potentential of contamination with hazardous substances, of streams and seasonal water reservoirs during rain fall events. Changes in the ground surface, created by the presence of the proposed rail yard, could alter surface drainage to adjacent waterways.

Wetlands

Approximately 55.9 acres of wetlands are located within the proposed rail yard. There are approximately 55.4 acres of palustrine emergent wetlands and approximately 0.5 acre or aquatic bed wetlands present within the proposed rail yard. These wetlands would likely be lost with the construction of the proposed rail yard. Loss would result from draining or filling these wetlands. A National Waterfowl Production area lies approximately 4,000 feet northeast of the proposed rail yard site. Impacts to adjacent wetlands could include sedimentation, redistribution or loss of top soil, and changes in hydrology.

Groundwater

No significant impact should result due to construction of the proposed rail yard. Impacts would be similar to those presented for Groundwater in Central Yard under Alternative B, Section 4.10.1.1.4.

4.10.2.1.5 Air

Impacts to the air quality from the construction and operation of the Central Yard would be similar to those described for this yard under Alternative B (Section 4.10.1.1.5).

4.10.2.1.6 Noise

No noise sensitive receptors are located within the proposed rail yard. There were no noise sensitive receptors within 500 feet of the proposed rail yard boundary.

4.10.2.1.7 Biological Resources

Vegetation

Construction activities associated with the development of the proposed yard facilities would cause both temporary and permanent impacts to vegetation. The conversion of approximately 535.8 acres of agricultural land to a rail yard facility could cause the loss of crops, if planted prior to construction. This cropland and pasture would no longer be available for agricultural production. Approximately 51.7 acres of emergent wetland vegetation and 0.7 acre of aquatic bed wetland vegetation would likely be cleared or disturbed during construction. Impacts associated with the construction and operation of the rail yard, such as soil loss due to erosion and the introduction of non-native or non-desirable species in buffer areas, where vegetation and surface soils are disturbed, are presented in Section 3.2.10.1. Potential spills of hazardous substances could affect water quality or soil properties in adjacent areas.

Grasses and woody species would likely reestablish naturally, or through reseeding and planting in the outer area and along fence lines of the proposed yard where rail facilities are absent. These areas would need to be maintained by mowing or trimming during operation to control excessive growth of ground cover and woody vegetation. Herbicides used to control weeds could impact adjacent vegetative communities during operation of the proposed rail yard.

Wildlife

A National Waterfowl Production area lies approximately 4,000 feet northeast of the proposed rail yard area. Impacts to wildlife in these wetland communities may be significant. Impacts to wildlife would be similar to those described for the Central Staging and Marshaling Yard under Alternative B (Section 4.10.1.1.7).

4.10.2.1.8 Transportation and Safety

There are four roadways (Section 4.10.1.1.8) that currently pass through the proposed rail yard site. It would be necessary to reroute or terminate these roadways prior to crossing the existing DM&E rail line or entering the proposed yard. Impacts associated with construction and operation would be similar to those presented for Transportation and Safety in the Central Staging and Marshaling Yard under Alternative B.

4.10.2.1.9 Socioeconomics

Approximately 250-300 rail jobs are expected during start-up of operations. At full operation, approximately 600 jobs would be provided. Impacts during construction and operation would be similar to those presented for Socioeconomics in the Central Staging and Marshaling Yard under Alternative B (Section 4.10.1.1.9).

4.10.2.1.10 Hazardous Materials

Impacts during construction and operation would be similar to those presented for Hazardous Materials in the Central Staging and Marshaling Yard under Alternative B (Section 4.10.1.1.10).

4.10.2.1.11 Cultural Resources

One cultural resource site (39BE2003) was identified within the area described for this location of the Central Staging and Marshaling Yard. A survey of the area would be conducted to determine if any other cultural resources or historic sites may be present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.10.2.2 New Wolsey BNSF Connection

The location and description would be the same as listed in Section 4.10.1.2 of Alternative B. Impacts due to construction and operation would also be the same.

Table 4.10-8
Current Land Use for Proposed Rail Yards Located Along Alternative C

Yard	Agricultural (Acres)	Residential (Acres)	Commercial (Acres)
Central	535.8	0	0

Table 4.10-9
Summary of Selected Impacts for Rail Yards Located Along Alternative C

Yard	Acres (approx.)	Prime Farmland	Streams	Wetlands	Noise Sensitive Receptors <500 feet
Central	606.1	0	0	55.9 acres	0

Table 4.10-10
Roadways Impacted by Proposed Rail Yards in South Dakota Along Alternative C

Yard and Roadways	Location	Average Daily Traffic
Central		
395 Avenue	Mile Post 368.0	20
Co Highway 15	Mile Post 369.0	305
393 Avenue	Mile Post 370.0	35
392 Avenue	Mile Post 371.0	20

4.10.3 PRB EXTENSION - ALTERNATIVE D

4.10.3.1 Middle East Staging and Marshaling Yards and Shops

4.10.3.1.1 Location

Under Alternative D, the Middle East Yard would be located approximately 2.0 miles west of Hetland, South Dakota. It would cross Lake Preston and end approximately 1.5 miles east of the Town of Lake Preston, South Dakota. It would be located between mile posts 316.0 and 319.0. The yard would be located primarily on the south side of the existing rail line. The yard would be 3.0 miles in length and 1,000 feet in width, with an area of approximately 363.6 acres.

4.10.3.1.2 Geology and Soils

The proposed Middle East Yard between Hetland and Lake Preston would be constructed in an area containing deposits of glacial till and alluvium. The dominant soil type is Poinsett-Waubay silt clay loams with an area containing Barnes-Buse loams at the northeastern end of the proposed rail yard site. These soils have moderate and moderately slow permeability respectively. The slope of the soil generally ranges from 1-6 percent with top soil depths ranging from 0 to 14 inches. These soils are well drained and susceptible to wind and water erosion. There are approximately 246.2 acres of prime farmland present within the proposed rail yard site. Impacts would be similar to those presented for the Central Staging and Marshaling Yards under Alternate B (Section 4.10.1).

4.10.3.1.3 Land Use

<u>Agriculture</u>

Approximately 261.7 acres within the proposed rail yard site are predominantly cropland. Approximately 3.7 acres contain woodlots or wooded fence rows. There are approximately 246.2 acres of prime farmland present within the proposed yard site. The land use would be changed and lost for agricultural production through conversion to a rail yard.

<u>Residential</u>

Approximately 6.8 acres of residential land is present within the proposed rail yard site. There are 2 houses located within the proposed rail yard site. This land would be acquired by the railroad and converted to railroad use. The buildings would be removed or converted to railroad use. There are 4 residences located within 500 feet of the proposed rail yard boundary. These consist of rural farmsteads. Impacts to these residences, during construction, could include noise, dust, increased road traffic and vehicle delays associated with the movement of construction equipment and road closures on area roadways. These impacts would be temporary, during construction of the proposed rail yard. Nearby residences would experience rail yard noise and inconvenience from road closure during operation of the proposed rail yard.

Commercial

There is no commercial property located within the proposed rail yard. There are no businesses located within 500 feet of the proposed rail yard boundary. Approximately 12.0 acres of property within the proposed rail yard consists of the existing DM&E rail line.

4.10.3.1.4 Water Resources

Surface Water

No defined streams are located within the proposed yard site. There are 2 lakes located in close proximity to the proposed rail yard. Lake Preston is bisected along the south edge by the existing DM&E rail line. Construction of the proposed rail yard would require draining or filling approximately 59.8 acres of the Lake Preston. Run-off from the proposed yard could affect water quality within Lake Whitewood, which is located approximately 3,000 feet south of the proposed rail yard site. Impacts to surface water, as described in Section 3.2.7.1, could include an increase in TSS and decaying plant material within these waterbodies. Potenial hazardous substance spills could occur during construction or operation of the proposed rail yard, potentially causing contamination of surface water. Changes in the ground surface created by the presence of the rail yard could alter surface drainage to adjacent waterways.

Wetlands

Approximately 81.9 acres of emergent wetland and 1.2 acres of aquatic bed wetlands are present within the proposed rail yard site. Approximately 59.8 acres of these wetlands are contained within the boundary of Preston Lake. These wetlands would likely be lost with the construction of the proposed rail yard. Loss would result from draining or filling these wetlands.

Impacts to adjacent wetlands could include sedimentation, redistribution or loss of top soil, and changes in hydrology.

Groundwater

Impacts to groundwater would be similar to those described in the Groundwater section of the Central Staging and Marshaling Yard under Alternative B (Section 4.10.1.1.4).

4.10.3.1.5 Air

Impacts to air quality from the construction and operation of the Middle East Yard would be similar to those described for the Central Yard under Alternative B (Section 4.10.1.1.5).

4.10.3.1.6 Noise

Noise disturbance would be present during construction and operation of this proposed rail yard facility. Noise associated with the construction and operation of a rail yard are described previousl under the Central Staging and Marshaling Yard for Alternative B. There are 4 noise sensitive receptors located within 500 feet of the proposed rail yard (Table 4.10-11).

Table 4.10-11
Noise Sensitive Receptors Located within 500 Feet of Proposed Middle West Staging and Marshaling Yard for Alternative D

Distance from Rail Yard	Location	Number of Noise Sensitive Receptors
0-100 feet	east of proposed yard boundary	1
101-200 feet	east of proposed yard boundary	1
201-400 feet	north of proposed yard boundary	1
401-500 feet	south of proposed yard boundary	1

4.10.3.1.7 Biological Resources

Vegetation

Construction activities associated with the development of the proposed yard facilities would cause both temporary and permanent impacts to vegetation. The conversion of approximately 259.4 acres of agricultural land to a rail yard facility could cause the loss of crops, if planted prior to construction. This cropland would no longer be available for crop production. Approximately 3.7 acres of woody vegetation would be cleared or disturbed during construction of the proposed rail yard. Impacts associated with the construction and operation of the rail yard, such as soil loss due to erosion and the introduction of non-native or non-desirable species in buffer areas, where vegetation and surface soils are disturbed, are presented in Section 3.2.10.1. Potential spills of hazardous substances could affect water quality or soil properties in adjacent areas.

Wildlife

Wildlife habitat in the proposed rail yard area have become habituated to activities associated with the existing rail line. However, short-term and long-term impacts are anticipated during construction and operation of the rail yard. Operational and construction impacts, as presented in Section 3.2.11, may include habitat loss, noise, train-wildlife collisions, increased human presence and the introduction of contaminants into the environment. Impacts during construction and operation would be similar to those presented for the Central Yard under Alternative B (Section 4.10.1.1.7).

4.10.3.1.8 Transportation and Safety

There are no roadways located within the proposed yard site. Construction traffic on local roads could cause traffic delay, wear on local roads, and increased safety concerns.

4.10.3.1.9 Socioeconomics

During construction, approximately 89 two-year jobs would be expected that are directly related to construction of the proposed rail yard. Jobs in the construction trades such as heavy equipment operators, carpenters, electricians and landscapers may be filled by local workers when available. Non-local workers could be used to fill shortages in construction positions and for actual rail construction activities. These workers would not likely locate permanently in the area. They would likely utilize temporary lodging, such as motels, hotels, rental property, recreational vehicle parks and campgrounds. These facilities are provided in the nearby communities of Lake Preston, Arlington, and DeSmet.

The estimated earnings for workers would total approximately $12.3 million (Table 4.10-3). A portion of this income would likely be spent on local goods and services. Additional short-term employment opportunities may be created in the service areas due to this spending and demand for goods and services. A portion of the earnings from construction would also provide tax revenues of approximately $937,300 for the state and county.

Approximately 250-300 permanent rail jobs are expected during the start-up of operations at this facility. At full operation, approximately 600 rail jobs could be provided. These jobs would be filled by both local and non-local persons. With the -8.5 percent decrease in the population of Kingsbury County between 1986 and 1994 (Table 4.3-20), the influx of these workers and their families should not be a problem for the county to accommodate. Although the increase in employment represents approximately 10 percent of the population of Kingsbury County, no significant impacts should occur related to the county's ability to maintain adequate services to its citizens, due to the prior decreases in population.

With an estimated 3.8 percent unemployment rate (Table 4.3-20), workers within the county, searching for employment, would benefit from the presence of high paying railroad jobs. Employment opportunities are expected to increase and unemployment decrease throughout the area. Commercial lodging and eating facilities are expected to be utilized by rail crews and workers and no DM&E facilities are expected to be provided at this location. Facilities located in nearby communities, such as Lake Preston and Hetland, could provide these services. An increase in support related jobs and contract jobs to fill these needs would be likely. Additional lodging and eating facilities could become established near the proposed yard site to provide convenient services to railroad workers. The potential increase in jobs could also provide additional tax revenues to the communities in surrounding areas and the county. Property taxes collected on new facilities would help Kingsbury County continue the services it provides, and possibly allow them to upgrade or increase what they currently provide.

4.10.3.1.10 Hazardous Materials

Searches of state and Federal databases, including RCRA, SHWS and CERCLIS-NFRAP were conducted to identify any listed contamination sites within a mile of the existing rail line. LUST and ERNS database searches investigated the area within 0.5 mile of the existing rail line. In Beadle County, 4 LUST sites, 1 ERNS site and 2 Spill Notification Reports were identified. If any of these sites are located within the proposed yard location, appropriate action would be necessary to avoid disturbance of the sites. Impacts during construction and operation are presented under Hazardous Materials for the Central Staging and Marshaling Yards in Alternative B (Section 4.10.1.2).

4.10.3.1.11 Cultural Resources

There are no known cultural resources or historic sites located within the proposed rail yard. A survey of the area would be conducted to determine if any sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.10.3.2 New Wolsey BNSF Connection

Location and description would be the same as listed in this section of Alternative B (Section 4.10.1.2).

4.10.3.3 Middle Staging and Marshaling Yard

4.10.3.3.1 Location

Under Alternative D, the Middle Yard would begin approximately 2.0 miles southwest of Capa, South Dakota and end approximately 1.0 mile east of Midland, South Dakota. The proposed yard would be located between mile posts 527.0 and 531.0. It would be 4.0 miles in length and 300 feet in width. The area of the proposed yard would be approximately 145.4 acres.

4.10.3.3.2 Geology and Soils

The proposed rail yard between Capa and Midland would be constructed in an area containing alluvium deposits with a Pierre Shale bedrock. A majority of the soils have moderate to very slow permeability. The dominant soil types in the area consist of Nimbro silty clay loam, Wendte silty clay, and Bullcreek clay. Slopes generally range from 0-6 percent with top soil depths of 0 to 8 inches. Soils are susceptible to erosion. No prime farmland is located within the proposed rail yard boundary. Impacts due to construction and operation of the proposed rail yard would be similar to those presented for the Central Staging and Marshaling Yard under Alternative B (Section 4.10.1.1.2).

4.10.3.3.3 Land Use

Agriculture

Approximately 132.6 acres within the proposed rail yard site are agricultural land. No prime farmland is located within the proposed rail yard boundary. The land use would be changed and lost for agricultural production through conversion to a rail yard. Approximately 0.5 acre of woody vegetation along streams and fence rows would be cleared. This land would also be converted to railroad use.

Residential

No residential land is present within the proposed rail yard site. One residence would be located within 500 feet of the proposed rail yard boundary. Impacts to this residence could include noise, dust, an increase in road traffic, and reduced access during construction and operation of the proposed rail yard. Residents could be inconvenienced by the closure of access roads to their property.

Commercial

No commercial land is present within the proposed rail yard site. There are no businesses within 500 feet of the proposed rail yard boundary. Approximately 12.3 acres of land within the proposed rail yard consists of existing DM&E rail line.

4.10.3.3.4 Water Resources

Surface Water

There are 5 intermittent streams which cross the proposed rail yard site. These would require realignment or channelization. The Bad River is located within 100 feet of the proposed rail yard. Impacts to surface water, as described in Section 3.2.7.1, could include an increase in water velocity due to channelization and stream bank stabilization, scouring and erosion of streams, and potential contamination from hazardous substances washing from the proposed yard site during rain fall events. Changes in the ground surface, created by the presence of the proposed rail yard, could alter surface drainage to adjacent waterways. Increased sediment and plant material in run-off could affect water quality in the Bad River and its tributaries in adjacent areas.

Wetlands

There are no wetlands found within the proposed yard site. Potential impacts to wetlands located in adjacent areas would be similar to those discussed in Section 3.2.7.2 and could include increased sedimentation and redistribution or loss of top soils.

Groundwater

Impacts to groundwater due to construction and operation of the proposed rail yard would be similar to those presented for the Central Staging and Marshaling Yard under Alternative B (Section 4.10.1.1.4).

4.10.3.3.5 Air

Air quality impacts from the construction and operation of the Middle Yard would be similar to those presented the Middle West Yard under Alternative B (Section 4.10.1.3.5).

4.10.3.3.6 Noise

Noise impacts due to construction and operation of the proposed rail yard would be similar to those presented for the Central Staging and Marshaling Yard of Alternative B (Section 4.10.1.1.6). There is one noise sensitive receptor located approximately 250 feet south of the proposed rail yard site.

4.10.3.3.7 Biological Resources

Vegetation

Impacts to vegetation from the construction and operation of the Middle Yard would be similar to those presented for the Middle West Yard under Alternative B (Section 4.10.1.3.7).

Wildlife

Impacts to wildlife due to the construction and operation of the proposed rail yard would be similar to those described for the Middle West Yard under Alternative B (Section 4.10.1.3.9).

4.10.3.3.8 Transportation and Safety

There are no roadways crossing the proposed yard site. Bad River Road extends along the north side of the proposed rail yard. Residents currently using the road to travel to and from their homes and fields could be impacted by increased road traffic, vehicle delays and inconvenience due to road closures during construction and operation of the proposed rail yard.

4.10.3.3.9 Socioeconomics

Socioeconomic impacts due to the construction and operation of the proposed rail yard would be similar to the socioeconimic impacts described for the Middle West Marshaling Yards under Alternative B (Section 4.10.1.3.9).

4.10.3.3.10 Hazardous Materials

Hazardous Material impacts due to the construction and operation of the proposed rail yard would be similar to the hazardous material impacts described for the Middle West Marshaling Yards under Alternative B (Section 4.10.1.3.10).

4.10.3.3.11 Cultural Resources

There are no known cultural resources or historic sites located within the proposed rail yard. A survey of the area would be conducted to determine if any sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

Table 4.10-12
Current Land Use for Proposed Rail Yards Located Along Alternative D

Yard	Agricultural (Acres)	Residential (Acres)	Commercial (Acres)
Middle East	261.7	6.8	0
Middle	132.6	0	0

Table 4.10-13
Summary of Selected Impacts for Proposed Rail Yards Along Alternative D

Yard	Acres (approx.)	Prime Farmland	Streams	Wetlands	Noise Sensitive Receptors <500 feet
Middle East	363.6	246.2	0	83.1 acres	4
Middle	145.4	0	5	0	1

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4.11 RAIL LINE EXTENSION STAGING AND MARSHALING YARDS

The impacts created from the construction and operation of the rail yards located along the proposed alternatives for extending DM&E's rail line in South Dakota and Wyoming are described in this section. Should the No-Action Alternative be chosen, the impacts described for Alternative B, C and D would not occur. Impacts are based on the conversion of the present land use at the proposed yard location to railroad right-of-way. Because of operational conflicts, rail yards could be located in different places depending on the alternative selected for rail line expansion. Rail yard locations for one alternative may not be feasible for another alternative. Therefore, rail yards are discussed based on their proposed locations for each extension alternative. When a proposed rail yard location would be the same for more than one alternative, this is indicated.

4.11.1 PRB EXTENSION - ALTERNATIVE B

4.11.1.1 New BNSF Interchange Yard

4.11.1.1.1 Location

The new BNSF Interchange Yard (Edgemont Yard) would be located northwest of Edgemont, South Dakota; and would be designed to operate as an interchange facility with BNSF Railroad. The Edgemont Yard would be located between mile post 720.0 and 723.0 on the north side of the rail line. The proposed Edgemont Yard would be 150 feet wide and 3.0 miles long, with a total area of approximately 54.5 acres.

4.11.1.1.2 Geology and Soils

Soils within the Edgemont Yard have a shallow bedrock layer and low water capacity. Hydric soils are present in the wetland at the site. The primary impact to soils would be the conversion of the property to an industrial site. During construction, the soils would be graded and covered with rail beds, gravel, concrete and asphalt. This conversion would remove these soils from producing forage for livestock and wildlife. In addition, during construction of the yards, erosion and loss of top soil could occur. This could increase erosion of adjacent soils unless proper drainage is provided. During operation, run-off from the Edgemont Yard or redirected surface water due to impermeable surfaces and structures within the Edgemont Yard could cause increased erosion and the formation of gullies in surrounding areas.

4.11.1.1.3 Land Use

Agriculture

The Edgemont Yard is designated as herbaceous rangeland. This designation encompasses most of the 54.5-acre site. Potential forage acreage and grazing land would be lost with the conversion to an industrial site. However, the loss of this rangeland would not be considered a significant impact, as herbaceous cover is abundant in the area.

Residential

A few scattered residences are located close to the Edgemont Yard. In addition, the Edgemont Yard is located within 0.5 mile of Dudley. However, the Edgemont Yard would be located close to the existing BNSF rail tracks and would not result in significant new impacts to residences. The noise levels would not vary much from those currently experienced by residents.

Commercial

There is no commercial property located within the proposed Edgemont Yard site.

4.11.1.1.4 Water Resources

Surface Water

The proposed Edgemont Yard would cross one intermittent stream, which is a tributary of the Cheyenne River. This stream would require realignment or channelization. Impacts to surface water, as described in Section 4.3.7.1, could include an increase in water velocity due to channelization and stream bank stabilization, scouring and erosion of the stream and potential contamination from hazardous substances. Changes in the hydrology created by the presence of the Edgemont Yard altering surface drainage could impact aquatic communities causing a loss of desired habitat.

Wetlands

One emergent wetland of approximately 0.5 acre is located within the project area. The construction of the Edgemont Yard would result in the loss of this wetland. In addition, wetlands located near the Edgemont Yard could be indirectly impacted by road construction. This activity could cause erosion, resulting in sediment reaching adjacent wetlands. Increased sedimentation could reduce the size, water depth and quality of adjacent wetlands. However, base facilities would not be constructed at the site. This could reduce construction disturbances and the wetland impacts. Edgemont Yard operational impacts to wetlands would not occur as no facilities would be located at this location.

Groundwater

The construction of the Edgemont Yard would not result in significant impacts to groundwater. However, possible contamination of the aquifer could result from a fuel or contaminant spill during construction or operation of the Edgemont Yard. If a fuel or chemical spill occurred during Edgemont Yard operations, it could cause significant impacts to groundwater aquifers if clean-up operations were not initiated quickly. During operation of the Edgemont Yard, small spills of fuel and lubricants could occur that would accumulate over time, resulting in impacts to groundwater. It is unlikely that aquifer contamination would occur; although groundwater contamination would be considered a significant impact.

4.11.1.1.5 Air

Construction and operation of the Edgemont Yard would create impacts to the air quality in the project area. Approximately 54.5 acres of ground would be disturbed during the construction of this yard. Fugitive dust created during ground clearing, and exhaust from construction vehicles would contribute to emission levels. However, these air impacts would be considered temporary.

During operation of this rail yard, locomotive emissions would be the primary source of air quality impacts. Locomotives moving through the Edgemont Yard would be expected to generate emissions which would contribute to air quality impacts. The function of this yard would be to serve as a location for two different railroads, DM&E and BNSF to deliver and pickup cars from one another. Locomotives would be expected to idle for short periods of time while changing cars. The amount of time trains spend exchanging cars and the number of trains using this yard has not been determined, therefore impacts to air quality would be expected to be similar to that of the existing rail line (Section 4.3.8) for Fall River County. Because this yard would contain no service and fueling facilities, no air quality impacts associated with such activities would exist.

4.11.1.1.6 Noise

The construction and operation of the Edgemont Yard would create noise impacts. Noise generated during construction would be temporary, occurring primarily during the use of heavy equipment and installation of rail line and other facilities. However, the Edgemont Yard would be located in a rural location, with very few residences located in close proximity to the project area. This factor eliminated the potential for significant impacts to residential areas.

During operations, noise would be generated by a variety of sources including diesel locomotive engines, retarders, pumps, and the coupling and uncoupling of rail cars. These noise sources would be scattered throughout the Edgemont Yard, thus reducing the magnitude of noise by spreading it over the Edgemont Yard. This would reduce the noise impacts in areas adjacent to the Edgemont Yard.

While the Edgemont Yard location has been determined, the exact location of rail tracks and other equipment is unavailable. Modeling to determine potential impacts requires the location of noise generating equipment. Therefore, noise contours could not be generated for rail yards. Because of the usual scattered nature of noise sources and their location within the interior of the Edgemont Yard, SEA conservatively determined that noise sensitive receptors within 500 feet of the Edgemont Yard boundary would be impacted.

4.11.1.1.7 Biological Resources

Vegetation

The Edgemont Yard would cross 54.0 acres of herbaceous grassland and 0.5 acre of emergent wetlands. Converting this plant community to an industrial facility would not result in significant impacts to project area vegetation, as this habitat is abundant in the region. Impacts associated with the construction and operation of this railroad yard would include clearing of vegetation, soil loss due to erosion and the introduction of non-native or undesirable species. These impacts are presented in more detail in Section 4.3.11. Potential spills of hazardous substances used during construction of the Edgemont Yard could impact vegetative communities in adjacent areas.

Grasses would likely reestablish naturally or through reseeding and planting by DM&E around the outer edges of the Edgemont Yard where rail facilities are absent. These areas would need to be maintained by mowing or trimming during operation to control vegetation growth.

Wildlife

The loss of grassland habitat would result in wildlife being displaced. Short-term and long-term impacts are anticipated during construction and operation of the Edgemont Yard. Operational and construction impacts could include habitat loss, noise, train-wildlife collisions, increased human presence and the introduction of contaminants into the environment.

During construction, vegetation within the Edgemont Yard would be cleared or disturbed, decreasing available habitat for some wildlife species. Small mammals, birds and reptiles/ amphibians would likely be displaced during construction of the Edgemont Yard. The loss of habitat due to construction would require wildlife using the area for cover and forage to relocate to adjacent grasslands. With abundant grassland habitat within the project area, the wildlife would be able to move to this adjacent habitat.

Loss of the wetland within the proposed Edgemont Yard would reduce waterfowl habitat. Because waterfowl are ground nesters, disturbance during nesting could result in destruction of nests and loss of nesting hens in the grasslands.

During construction activities, increased TSS could reach the Cheyenne River through the tributaries. This potentially could impact fish and other aquatic species downstream.

During operation, impacts to wildlife would be primarily due to disturbance from Edgemont Yard activity. However, no facilities are planned which would lessen operational impacts at the proposed Edgemont Yard. Depending on the level of disturbance, many smaller wildlife species could return to habitat within the Edgemont Yard after construction activities. Potential impacts to fish and aquatic species could result from fuel, herbicide and chemical contamination of the intermittent stream. This stream is in the Cheyenne River watershed, and a spill could impact aquatic species in the river.

Sensitive, Threatened, and Endangered Species

Potential impacts to threatened and endangered species could occur from activities at the Edgemont Yard. Contamination from diesel fuel or other hazardous materials could enter the intermittent stream and reach the Cheyenne River, potentially impacting the sturgeon chub and other endangered or threatened species in the river. If an accidental discharge were to occur, the impacts to these species could be significant. Potential noise disturbance would decrease as eagles using the Cheyenne River would become acclimated to the noise and activities associated with the Edgemont Yard.

4.11.1.1.8 Transportation and Safety

Construction activities at the Edgemont Yard could impact some small rural, ranching roads. However, impacts would be minimal and could result in some rerouting and in the termination of existing roads. Potential impacts during construction would include increased traffic congestion due to the transportation of materials and work crews to the Edgemont Yard.

The operation of the Edgemont Yard could increase use of area roads as motorists find alternative routes to those closed or rerouted during construction. However, this yard is located in a rural area, with minimal traffic and any increase in road use would not likely slow the transportation systems. Traffic delays and safety concerns associated with grade crossings would not be experienced at the rerouted roadways following construction of this yard.

4.11.1.1.9 Socioeconomics

No employees or facilities are expected to be located at the Edgemont Yard, therefore this yard would have no impact on the socioeconomic climate of the Edgemont area.

4.11.1.1.10 Hazardous Materials

Neither construction or operation of the proposed Edgemont Yard would result in an increase in the types or amounts of hazardous materials currently transported by DM&E. Potential impacts during construction could include disturbance of hazardous waste sites that could have been located within the proposed Edgemont Yard. During operation of the Edgemont Yard, DM&E would coordinate with the EPA and the South Dakota Department of Environmental Quality to determine if the proposed Edgemont Yard had prior hazardous waste contamination. This information would be included in the Phase 1 Environmental Site Assessment, which is used as a basis for determining contamination before acquiring property.

During operation, no impacts would occur to existing hazardous material sites. There would be a potential for spills resulting from derailments or improper handling of hazardous materials such as fuel, oil and lubricants. Contamination from spills would be unlikely due to the expected reduction in derailments and required compliance with regulatory procedures regarding handling, storage and disposal of hazardous substances.

4.11.1.1.11 Cultural Resources

The disturbance of cultural resources during the construction of the Edgemont Yard is likely. A survey of the area would be conducted to determine if any sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.11.1.2 West Staging & Marshaling Yard

4.11.1.2.1 Location

The West Staging and Marshaling Yard (West Yard) is located northwest of Edgemont in Weston County, Wyoming. The West Yard would be located between mile posts 760.0 and 764.0 on the north side of the DM&E rail line. The proposed West Yard would be 1,300 feet wide and 3.1 miles long, with a total area of approximately 488.5 acres.

4.11.1.2.2 Geology and Soils

The proposed West Yard site contains soils that have a shallow bedrock layer and have low available water capacity. In addition, steep slope soils with a 15 percent grade are present at the site. These soils would be classified as having high erosion potential. The primary impact to soils would be that the proposed West Yard site would be converted to long-term industrial use. This conversion would remove these soils from producing forage for livestock and wildlife. Soils would be graded and covered with rail beds, gravel, concrete and asphalt. In addition, during construction and operation of the West Yard, runoff may increase to adjacent areas. This could increase erosion unless proper drainage is provided. Construction activities would avoid steep slope areas, thus preventing erosion in these highly sensitive soils. The development of the West Yard would be a long-term impact as the soils would be taken out of grass production and converted to an industrial facility.

4.11.1.2.3 Land Use

<u>Agriculture</u>

The development of the West Yard would convert approximately 488.5 acres of herbaceous rangeland to an industrial facility. Converting this land to an industrial facility would reduce grazing on this property, which would displace livestock. Ranchers using this property would have to relocate livestock to other range within the project area. This impact would be long-term, as the property would be unsuitable for grazing for the duration of the project.

<u>Rangeland</u>

The development of the West Yard would impact grazing allotments on USFS lands. The loss of these allotments would be long-term and require that they be moved to other available NFS property. In addition, cattle trails, guards and watering sites present in the West Yard would require mitigation. The loss of grazing within the West Yard would be long-term and would last for the life of the West Yard.

Residential

There are no residential areas within the proposed West Yard site. No identified residences are located within 500 feet of the West Yard boundaries.

Commercial

There is no commercial property located within the proposed West Yard site.

Forest Service Lands

The proposed West Yard would cross approximately 1.5 miles of TBNG. Removal of this land from the TBNG matrix could be a significant impact; and would likely require that private land be transferred to the USFS to mitigate the loss of Federal property.

4.11.1.2.4 Water Resources

Surface Water

Approximately eight intermittent streams, tributaries of Lodgepole Creek, would be crossed by the West Yard. These could require realignment or channelization. During construction and operation of the West Yard, the potential for increased erosion and an increase in water velocity due to channelization and stream bank erosion exists. However, seeding and mulching of disturbed areas would reduce erosion during and following construction. Once post-construction revegetation is completed, the probability of erosion would decrease.

Potential contamination of intermittent streams could impact aquatic resources in Lodgepole Creek. However, safe rail operations and proper handling of hazardous materials would minimize potential contamination impacts. Changes in hydrology created by the presence of the West Yard altering surface drainage could impact aquatic communities. These changes could cause a loss of desired habitat and disrupt the current balance within aquatic communities. Overall, with proper construction and operation procedures followed, no significant impacts to surface water would occur.

Wetlands

No wetlands would be located at the West Yard site under Alternative B

Groundwater

The impacts to groundwater would be similar to what is discussed for the BNSF Interchange Yard in Section 4.11.1.1.4.

4.11.1.2.5 Air

Construction and operation activities associated with the West Yard could create local impacts to air quality. During construction, approximately 488.5 acres of ground would experience varying degrees of disturbance which would be a likely source of fugitive dust. Construction equipment such as graders and earth movers would be a source of emissions while operating. While more concentrated and occurring for a longer period, these emissions would be similar to emissions and fugitive dust generated from current agricultural use of the yard site. Construction related affects to air quality would be limited to the period of yard construction. Vehicle emissions from motorists delayed during yard construction would not occur as the only roads affected by this yard would be rural with low ADTs (Section 4.11.1.2.9).

Locomotive emissions would be the primary source of air quality impacts from the West Yard. The West Yard would have limited refueling facilities. Escaping fumes during refueling could contribute to air quality impacts. SEA has calculated air quality impacts due to the operation of the yard according to the methodology presented in Appendix E. Table 4.11-1 presents the amount of emissions from locomotive activities under the 20 MNT (8 trains per day), 50 MNT (18 trains per day), and 100 MNT (34 trains per day) operating scenarios.

Table 4.11-1
Emission Levels of Proposed West Staging & Marshaling Yard

Operating Level	HC		CO		NO_x		SO_2		PM_{10}		Pb	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
20 MNT (8 trains per day)	2.28	9.57	6.21	26.07	32.50	136.48	4.03	16.91	1.55	6.52	1.26E-04	0.00052963
50 MNT (18 trains per day)	5.13	21.54	13.97	58.67	73.12	307.08	9.06	38.04	3.49	14.67	2.84E-04	0.00119167
100 MNT (34 trains per day)	9.69	40.69	26.38	110.81	138.11	580.05	17.11	71.86	6.60	27.70	5.36E-04	0.00225093

4.11.1.2.6 Noise

The noise impacts from the West Yard would be similar to what is discussed in Section 4.7.1.1.6.

4.11.1.2.7 Biological Resources

Vegetation

The West Yard would cross mostly herbaceous grassland; although riparian plant communities exist along the intermittent streams. Conversion of herbaceous grassland to an industrial facility would not result in significant impacts to project area vegetation, as this habitat is abundant in the region. However, any loss of riparian plant communities would be a significant impact of an important regional resource. Riparian corridors provide important wildlife habitat and are used by livestock for resting/grazing. The construction activities would avoid these areas, thus preventing long-term impacts to this plant community.

Big Game

The proposed West Yard is used as yearlong range by pronghorn and mule deer. Development of the West Yard would involve fencing of the property, which could impede movement of big game in the project area. This could result in long-term impacts to big game in the project area, as travel corridors may be blocked that were used to reach watering and resting habitat. The loss of herbaceous grassland would not be significant for big game in the area, as the plant community is abundant in the project area.

Non-Game Species

The clearing of grasslands during construction would result in short-term impacts to nesting habitat used by non-game birds. Most birds utilizing the property would move to suitable habitat in the vicinity of the West Yard. Grassland habitat is abundant in the region, thus no significant, long-term impacts to local bird populations would occur. Once construction is completed, and the site is revegetated, many species could return to suitable habitat in the West Yard. Small mammals and reptiles would also be displaced during construction, returning once the West Yard has been revegetated.

Raptors

Raptor surveys of this proposed West Yard have not been completed to date. However, raptors would likely nest along the riparian corridors within the West Yard. Construction and operation of the West Yard would result in noise that would probably make nesting along the riparian areas unsuitable. The raptors that are now nesting within the project area would move, or become acclimated to the West Yard noise and continue utilizing their sites. Raptors that are displaced would be able to find suitable habitat in the region.

Sensitive, Threatened, and Endangered Species

The development of the West Yard could impact black-tailed prairie dog colonies. If colonies were disrupted, impacts could occur to species dependent on such habitat, such as mountain plovers and swift fox. The West Yard would cross numerous intermittent streams and is close to Lodgepole Creek, increasing the chance that a toxic spill could reach the Cheyenne River and impact Federally-listed threatened and endangered species. If impacts to candidate and listed species were to occur, they would be considered significant and would require mitigation.

4.11.1.2.8 Transportation and Safety

No major roads would be crossed by the West Yard. However, short term impacts to rural roads would occur during construction and operation. Construction and operation traffic could cause wear on local roads and increased traffic concerns. However, due to the rural nature of the area, no major impacts to traffic would result from the West Yard development.

4.11.1.2.9 Socioeconomics

During construction, approximately 63 two-year jobs would be created that are directly related to construction of the West Yard. Jobs in the construction trades such as heavy equipment operators, carpenters, electricians and landscapers would be filled by local workers when available. Non-local workers could be used to fill shortages in construction positions and for actual rail construction activities. These workers would not locate permanently in the area, however, they would utilize temporary lodging, such as motels, hotels, rental property, recreational vehicle parks and campgrounds.

Approximately 100 employees would be expected to be based in Weston County at the start-up of West Yard operations. At full operation, the facility would be expected to employ about 300 railroad employees. In addition, an increase in contract and support related jobs would be expected once the West Yard would be fully operational. An increase in jobs could provide additional tax revenue to Weston County. The West Yard is expected to be a major rail staging facility, and would include maintenance and minor repair units.

4.11.1.2.10 Hazardous Materials

The potential impacts from hazardous materials would be the same as discussed for BNSF Interchange Yard (Section 4.11.1.1.10).

4.11.1.2.11 Cultural Resources

The disturbance of cultural resources during the construction of the West Yard would be likely. A survey of the proposed site would be required to determine if any cultural resource sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.11.1.2.12 Aesthetics

Viewsheds/Scenic Values

The portion of the West Yard that crosses NFS land is within a VQO of modification. This visual designation requires that facilities, buildings, roads and signs must utilize materials, textures and colors from the existing environment.

4.11.2 PRB EXTENSION - ALTERNATIVE C

4.11.2.1 Middle West Staging and Marshaling Yard

4.11.2.1.1 Location

The Middle West Staging and Marshaling Yard (Middle West Yard) is located north of Wall. The Middle West Yard would be located between mile posts 590.4 and 592.5 on the north and south side of the DM&E rail line. The proposed Middle West Yard would be 300 feet wide and 2.1 miles long, with a total area of approximately 76.4 acres.

4.11.2.1.2 Geology and Soils

The proposed Middle West Yard site at Wall, South Dakota would cross soils that have a shallow bedrock layer and have low available water capacity. In addition, hydric soils are present in wetlands at the site. The primary impact to soils could be that the proposed Middle West Yard site would be converted to long-term industrial use. Soils would be graded and covered with rail beds, gravel, concrete and asphalt. This conversion would remove these soils from producing forage for livestock and wildlife. In addition, during construction and operation of the Middle West Yard, runoff would increase to adjacent areas. This would increase erosion of adjacent soils unless proper drainage is provided.

4.11.2.1.3 Land Use

Agriculture

The proposed Middle West Yard is primarily classified as cropland and pasture. This designation encompasses most of the 76.4-acre site. Construction of the Middle West Yard would require the permanent conversion of this agricultural land to railroad right-of-way.

Residential

A portion of the Middle West Yard could affect residential areas around Wall. Construction activities near residences would result in noise, dust, increased traffic and increases in emissions from construction equipment. These impacts would be short-term, and would exist only during the construction activities at the Middle West Yard.

Potential impacts to residential areas in Wall from operation of the Middle West Yard would result from noise, emissions/dust and increased traffic. However, there are no residents within 500 feet of the proposed rail yard therefore, impacts to residential area would be minimal.

4.11.2.1.4 Water Resources

Surface Water

No surface water is located within the proposed Middle West Yard site.

Wetlands

Construction of the Middle West Yard could impact 3 emergent wetlands located within the project area. Total acreage of the wetlands is approximately 15.0 acres. Any degradation or loss of wetlands could be considered a significant impact. In addition, wetlands located near the Middle West Yard could be indirectly impacted by road construction. Clearing of vegetation, grading and earthmoving could lead to erosion, resulting in sediment reaching adjacent wetlands.

Increased sedimentation could reduce the size, water depth and quality of the wetlands. During operation of the Middle West Yard, run-off could result in sediment reaching adjacent wetlands.

Groundwater

Potential impacts to groundwater from construction and operation of this yard would be similar to those described in Section 4.11.1.1.4.

4.11.2.1.5 Air

Construction and operation of the Middle West Yard could create local impacts to air quality. During construction, approximately 76.4 acres of ground would experience disturbance which would create fugitive dust. Construction equipment would produce exhaust emissions while operating. While more concentrated and occurring for a longer period of time, these emissions and dust would be similar to what is currently generated by agricultural activity in the project area. Vehicle emissions from motorists delayed at grade crossings would not occur as the only road in the area of the proposed rail yard would be closed and traffic rerouted.

During operation of the Middle West Yard, locomotives would be the primary source of air quality impacts. During operation, each locomotive to use the yard would spend approximately 0.5 hour idling. Table 4.11-2 presents the amount of emissions from locomotive activities under the 20 MNT, 50 MNT, and 100MNT operating scenarios.

Table 4.11-2
Emission Levels of Proposed Middle West Staging & Marshaling Yard

Operating Level	HC		CO		NO_x		SO_2		PM_{10}		Pb	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
20 MNT (11 trains per day)	3.13	13.16	8.54	35.85	44.68	187.66	5.54	23.25	2.13	8.96	1.73E-04	0.00072824
50 MNT (21 trains per day)	5.98	25.13	16.30	68.44	85.30	358.26	10.57	44.38	4.07	17.11	3.31E-04	0.00139028
100 MNT (37 trains per day)	10.54	44.28	28.71	120.59	150.29	631.23	18.86	76.2	7.18	30.15	5.83E-04	0.00244954

4.11.2.1.6 Noise

There would be no noise sensitive receptors located within 500 feet of the proposed Middle West Yard therefore, impacts from noise would not occur.

4.11.2.1.7 Biological Resources

Vegetation

The proposed Middle West Yard site would require the conversion of approximately 76.4 acres of cropland and pasture into railroad right-of-way. Cropland could no longer be available for production. Impacts to vegetation associated with the construction and operation of the Middle West Yard would include soil loss due to erosion, and the introduction of non-native or non-desirable plant species during reseeding.

Grasses would likely reestablish naturally or through reseeding and planting in the outer areas of the Middle West Yard where facilities are absent. The buffer areas of the Middle West Yard could be reestablish with grasses along fence rows after construction is complete. The use of herbicides to control weeds could impact adjacent vegetation communities during operation of the Middle West Yard if not administered properly.

Wildlife

The loss of the three emergent wetlands could result in reduction of waterfowl and wildlife habitat in the project area. Construction activities in the spring/summer could result in destruction of waterfowl nests and nesting hens. It is expected that waterfowl and shorebirds using the wetlands would leave the area and utilize similar habitat in the project area. Small mammals, songbirds and amphibians using the wetlands would also be displaced during construction of the Middle West Yard.

The clearing of cropland could displace wildlife using this habitat. It is expected that the smaller, less mobile species would suffer mortality from the construction activities at the Middle West Yard. However, many wildlife species would leave the area and seek similar habitat near the project area. During operation, impacts to wildlife would be primarily due to disturbance from the Middle West Yard activity. However, the level of activity and lack of grassland habitat within the proposed Middle West Yard would likely result in most wildlife moving to adjacent habitat.

4.11.2.1.8 Transportation and Safety

The Middle West Yard would cross 1 public roadway, Township Road, resulting in impacts to local traffic. The ADT for this roadway is 100 vehicles per day. During construction and operation of the Middle West Yard traffic would no longer have access through this area. It would be necessary to reroute or terminate this roadway prior to crossing the DM&E rail line or entering the proposed rail yard. Potential traffic delays, increased safety concerns and reduced emergency vehicle access on local roadways could occur due to construction traffic on local roads. Construction traffic could cause increased wear on local roadways.

4.11.2.1.9 Socioeconomics

Approximately 20-30 jobs would be expected to be based at the Middle West Yard at the start-up of operations. However, once it is in full operation, the Middle West Yard is expected to create 40-50 permanent jobs. These job estimates only include direct railroad employees. Crew lodging and eating facilities are not planned here, as it is expected that commercial facilities would be utilized. Additional lodging and eating facilities could become established near the proposed Middle West Yard site to provide convenient services to railroad workers. In addition, an increase in contract and support related jobs would be expected once the Middle West Yard is fully operational. The potential increase in jobs could also provide additional tax revenues to the communities in the surrounding areas and the county.

4.11.2.1.10 Hazardous Materials

The impacts resulting from hazardous materials would be similar to those discussed in Section 4.11.1.1.10.

4.11.2.1.11 Cultural Resources

The disturbance of cultural resources during the construction of the Middle West Yard would be likely. A survey of the proposed site would be required to determine if any cultural resource sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.11.2.2 New BNSF Interchange Yard

4.11.2.2.1 Location

The New BNSF Interchange Yard (Edgemont Yard) would be designed to operate as an interchange facility with BNSF Railroad at Edgemont (Dudley), South Dakota. The Edgemont Yard would be located at mile post 761.75 and extend northeast along the BNSF rail line. The Edgemont Yard would be 150 feet wide and 1.5 miles long, with a total land area of approximately 27.3 acres.

4.11.2.2.2 Geology and Soils

The primary soil types would include loamy fine sand, silt loams, and some clay soils. Approximately 1.4 acres of prime farmland would be lost during construction of the rail yard. Permeability is very slow to rapid. Slopes range from 0-2 percent for the Tilford and Arvada soils to 6-25 percent for the Dwyer soils at the south end of the proposed rail yard. Soils are generally poorly suited for building sites due to shrink-swell potential and steep slopes. The Edgemont Yard could result in increased erosion unless proper drainage is provided.

4.11.2.2.3 Land Use

Agriculture

The Edgemont Yard would be constructed in an area that is primarily herbaceous rangeland. Potential forage acreage would be lost with the conversion to an industrial facility. Approximately 26.7 acres of rangeland would be lost. Approximately 1.4 acres of prime farmland would be lost. Impacts would not be significant due to the abundance of rangeland in the area and the close proximity to an existing rail line.

4.11.2.2.4 Water Resources

Surface Water

The Edgemont Yard would cross one intermittent stream, a tributary of the Cheyenne River. In addition, the Edgemont Yard would be located within 0.5 mile of the Cheyenne River. Water quality issues associated with erosion and contamination could result in impacts to the Cheyenne River. However, safe rail operations and limited transportation of hazardous materials would minimize potential contamination impacts. Erosion impacts would be minimal, as facilities would not be constructed at the Middle West Yard. The development of the Edgemont Yard would not result in significant impacts to surface water.

Wetlands

The Edgemont Yard would cross approximately 0.7 acre of emergent wetland. Impacts to this wetland would be the same as discussed for the BNSF Yard in Alternative B.

Groundwater

Impacts to groundwater would be similar to those discussed in Section 4.11.1.1.4.

4.11.2.2.5 Air

Impacts to air quality from the construction and operation of this rail yard would be similar to what is described in Section 4.11.1.1.5, for the Edgemont Yard under Alternative B.

4.11.2.2.6 Noise

Impacts from noise would be similar to those discussed in Section 4.11.1.1.6.

4.11.2.2.7 Biological Resources

Vegetation

The vegetation community at the proposed Edgemont Yard site would be composed of approximately 26.7 acres of cropland and pasture and 0.7 acre of emergent wetlands. During construction of this yard the 27.3 acres would be converted to railroad right-of-way. The loss of grassland and wetland vegetation during construction would be a permanent, long-term impact. Any grassland acres removed would mean less habitat and forage available for wildlife and cattle in the project area.

Wildlife

The loss of grassland habitat would result in wildlife being displaced. However, most species would be able to move to similar grassland habitat within the project area. Small mammals, songbirds and reptiles could be displaced during the initial development of the Edgemont Yard; although they could return once the site is stabilized and revegetated. The development of the Edgemont Yard would not result in significant impacts to wildlife in the project area.

Sensitive, Threatened, and Endangered Species

The impacts to threatened and endangered species would be the same as discussed for the BNSF Yard in Alternative B (Section 4.11.1.1.7).

4.11.2.2.8 Transportation and Safety

The Edgemont Yard would cross Fall River County Road 15, and would require that this roadway be terminated or an alternate road be developed.

During operation of the Edgemont Yard, increased use of area roads could occur as DM&E employees drive from Edgemont to the site. However, any impacts are expected to be insignificant to the traffic patterns. The Edgemont Yard is located in a rural area, with minimal traffic and any increase in road use would not slow the transportation patterns.

4.11.2.2.9 Socioeconomics

No employees or facilities are expected to be located at the Edgemont Yard. However, the facility would create positions for several employees who would most likely live in the Edgemont area. Overall, the socioeconomic impacts from development of the Edgemont Yard are not expected to be significant.

4.11.2.2.10 Hazardous Materials

Potential impacts from hazardous material would be similar to what is described in Section 4.11.1.1.10.

4.11.2.2.11 Cultural Resources

The disturbance of cultural resources during the construction of the Edgemont Yard would be likely. A survey of the proposed site would be required to determine if any cultural resource sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.11.2.3 West Staging and Marshaling Yards

4.11.2.3.1 Location

Option A

The 945.0-acre West Staging and Marshaling Yard (West Yard) would be located on the Campbell and Weston County, Wyoming boundary. The West Yard would be located between mile posts 787.0 and 793.0 and would include 71.0 acres of USFS land, 78.0 acres of state land and 795.0 acres of private land. The West Yard would be 1,300 feet wide and 6 miles long.

Option B

Option B would be a 945.0-acre alternative for the West Yard. This alternative would be the same size as Option A, but would avoid impacts to USFS lands, and would be composed of private and state properties. The West Yard would be located between mile post 787.0 and 793.0.

4.11.2.3.2 Geology and Soils

Option A and B

The proposed West Yard site would include soils that have a shallow bedrock layer and low available water capacity. In addition, soils with a slope greater than 15 percent exist at the West Yard, and these soils would have a high erosion potential. The primary impact to soils would be that the proposed West Yard site would be converted to long-term industrial use. This conversion would remove these soils from producing forage for livestock and wildlife. In addition, during construction and operation of the West Yard, runoff may increase to adjacent areas. This could increase erosion unless proper drainage is provided. Construction activities would avoid steep slope areas, thus preventing erosion in these highly sensitive soils. The development of the West Yard would be a long-term impact as the existing soils would be taken out of grass and crop production and converted to an industrial facility.

4.11.2.3.3 Land Use

Agriculture

Option A

The development of the West Yard would affect approximately 945.0 acres of herbaceous rangeland and some cropland. Converting this site to an industrial facility would remove this land from grazing and some agricultural production. However, the loss of this land would not be considered a significant impact as herbaceous rangeland is abundant in the region.

Option B

The development of the West Yard option would primarily affect herbaceous rangeland. The conversion to an industrial facility would remove this land from current and future agricultural use. However, the loss of this land use would not be considered a significant impact as herbaceous rangeland is abundant in the region.

Residential

No residential lands are located within 500 ft of the West Staging Yard.

Forest Service Lands

The West Yard would be composed of 71.0 acres of TBNG, which is administered by the NFS. Removal of this property from the TBNG matrix would be a significant impact, and would result in mitigation, possibly resulting in transfer of private property to the USFS. The primary use of this property is the USFS grazing allotment program.

Option A

The West Yard would significantly impact several Federal grazing allotments. Development would eliminate the School Creek Allotment- Little Thunder pasture, Small Allotment- Little Thunder pasture, and the Keeline Allotment -- South Burdwick and Bull pastures, from using grassland within the West Yard. The loss of Federal grazing on this land would be a permanent, long-term impact and would need to be mitigated by DM&E railroad.

Option B

Most of this option would impact grazing on private property. However, a segment of this option would cross Wyoming state property, eliminating the use of this land for grazing. The loss of this grazing on state owned property would be a significant impact, as ranchers would have to move cattle to another property. Availability of Federal or state land for grazing in the project area could be a concern, as construction of the rail line eliminates allotments. The loss of these allotments would require mitigation.

State Lands

Option A

The West Yard would be composed of 78.0 acres of Wyoming state land, which is used for grazing. Development of the West Yard would result in eliminating the grazing on this land. This loss of grazing land could result in significant impacts to some ranchers who utilize the property. However, the extent of the impacts is not known, and would be dependent on whether a rancher has access to other grazing properties.

Option B

Option B would be composed of approximately 45.0 acres of Wyoming state land, which is used for grazing. The impacts from development of this property are discussed in the previous section on grazing.

4.11.2.3.4 Water Resources

Surface Water

Option A

The West Yard would cross 21 intermittent streams, all tributaries to Little Thunder Creek. These would require realignment or channelization. This could result in changes to hydrology in these streams, as water velocity could increase and cause significant erosion within the West Yard. Water quality issues associated with erosion and contamination could impact Little Thunder Creek. However, safe rail operations and limited transportation of hazardous materials would minimize potential contamination impacts. The construction of facilities at the West Yard would increase erosion into streams, possibly impacting water quality in Little Thunder Creek. In addition, failure to stabilize disturbed slopes adjacent to streams could result in increased erosion and sedimentation of surface waters. Seeding, mulching and the use of riprap in disturbed areas would reduce erosion during and following construction. The use of proper construction procedures would result in no significant impacts to surface water in the project area.

West Yard operations could result in sediment reaching Little Thunder Creek and impacting aquatic life in the watershed. A spill of hazardous materials or chemicals at the West Yard could potentially enter the watershed and impact aquatic organisms. However, safe handling procedures and adherence to regulations would minimize this potential impact.

Option B

This option would cross six intermittent streams, all tributaries to Little Thunder Creek. The impacts to surface water would be the same as described for Option A.

Wetlands

No wetlands would be located at the proposed West Yard site.

Groundwater

The impacts to groundwater would be the similar to what is discussed in Section 4.11.1.1.4.

4.11.2.3.5 Air

Impacts to air quality resulting from construction and operation of the West Yard would be similar those described under Alternative B (Section 4.11.2.1.5).

4.11.2.3.6 Noise

Noise impacts would be similar to those discussed for the West Yard under Alternative B (Section 4.11.2.1.6).

4.11.2.3.7 Biological Resources

Option A and B

Vegetation

The West Yard would cross mostly herbaceous grassland, although some riparian plant communities exist along the intermittent streams. Conversion of herbaceous grassland to an industrial facility would not result in significant impacts to project area vegetation, as this habitat is abundant in the region. However, any loss of riparian plant communities would be a significant impact of an important regional resource. Riparian zones provide important wildlife habitat and are used by livestock for resting and grazing. The construction activities would avoid these areas, thus preventing long-term impacts to this plant community.

Some reestablishment of grasses would naturally occur after the facilities have been constructed. This would occur primarily along the outer areas of the West Yard where facilities are absent. The use of herbicides to control weeds could impact adjacent vegetation communities during operation of the West Yard.

Big Game

Option A

The West Yard is used as yearlong range by pronghorn and mule deer. Development of the West Yard would involve fencing of the property, which could prevent big game south of the West Yard from moving north to water at Little Thunder Creek. This could result in long-term impacts to big game populations in the project area, as individuals and herds may need to move to other habitat for watering. The loss of herbaceous grassland would not be significant for big game in the area, as the habitat is abundant in the project area.

Option B

The West Yard is used as yearlong range by pronghorn and mule deer. Potential impacts could occur from fencing the West Yard and interrupting migration corridors for these species. This impact could be significant for those individuals and herds who utilize the West Yard for travel. However, the impacts would be short-term, as big game would leave the project area and utilize different travel corridors.

Non-Game Species

Option A and B

The clearing of grasslands during construction would result in short-term impacts to nesting habitat used by non-game birds and small mammals. Most birds and small mammals utilizing the property would move to suitable habitat in the vicinity of the West Yard. Grassland habitat is abundant in the region, thus no significant, long-term impacts to local bird populations would occur. Once construction is completed, and the site revegetated, many species could return to suitable habitat in the West Yard.

Raptors

Option A

Almost the entire six (6) miles of the West Yard is within 500 feet of Little Thunder Creek, and within 500 feet of four (4) raptor nests. One golden eagle nest and 1 red-tailed hawk nest are located within 500 feet of the West Yard along Little Thunder Creek. In addition, 3 red-tailed hawk nests are within 1 mile of the West Yard. Construction and operation of the West Yard would result in noise that would probably make nesting habitat along the creek unsuitable for raptors. The raptors that are now nesting along the creek could move, or they could become acclimated to the West Yard noise and continue utilizing their sites. Development of the West Yard would not result in significant, long-term impacts to regional raptor populations. However, short-term impacts would result in some displacement of birds as the West Yard is developed.

Option B

No surveys of Option A have been completed for the occurrence of raptors. However, raptors could utilize stands of cottonwood occurring along the intermittent streams within the West Yard. Construction and operation of the West Yard could make existing nests unsuitable for raptors. It is likely that West Yard development would result in birds leaving existing sites and seeking more remote habitat.

Sensitive, Threatened and Endangered Species

Option A

The development of the West Yard has the potential to adversely impact numerous black-tailed prairie dog colonies. If colonies were disrupted, impacts could occur to species dependent on such habitat, such as mountain plovers and swift fox. Depending on the level of disturbance, the impacts could be short-and long-term. The loss of prairie dog habitat at the West Yard would also mean that future use of the West Yard by black-footed ferrets would not occur. Yard disturbances during construction and operations would likely displace wintering bald eagles along Little Thunder Creek. The West Yard crosses numerous intermittent streams and is close to Little Thunder Creek, increasing the chance that a toxic spill could reach the Cheyenne River and impact Federally-listed threatened and endangered species. If impacts occur to listed species they would be considered significant and would require mitigation.

Option B

The impacts to threatened and endangered species would be the same as discussed for Option A. However, this option is not as close to Little Thunder Creek, thus it would not have the potential to impact as many raptors as Option A.

4.11.2.3.8 Transportation and Safety

Option A and B

No major roads are crossed by the West Yard. However, short-term impacts to smaller roads would occur during construction activities at the West Yard. Construction traffic on local roads could cause additional traffic delays, wear on local roads and increased safety concerns. During operation of the West Yard, increased use of area roads would also occur. However, no impacts to traffic would result, as the rural roads would be able to handle the increased use.

4.11.2.3.9 Socioeconomics

Option A and B

About 100 employees are expected to be based at the West Yard at the start-up of coal transport operations. At full operations, the facility would be expected to employ about 300 direct railroad employees. In addition, an increase in contract and support related jobs would be expected once the West Yard is fully operational. Additional lodging and eating facilities could become established near the proposed West Yard site to provide convenient services to railroad workers. This increase in jobs and businesses could provide additional tax revenues to the communities in the surrounding areas and Weston County. The West Yard is expected to be a major rail staging facility, and would include maintenance and minor repair units.

4.11.2.3.10 Hazardous Materials

Option A and B

Potential impacts from hazardous materials would be similar to those discussed in Section 4.7.1.1.10.

4.11.2.3.11 Cultural Resources

The disturbance of cultural resources during the construction of the West Yard would be likely. A survey of the proposed site would be required to determine if any cultural resource sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.11.2.3.12 Aesthetics

<u>Viewsheds/Scenic Values</u>

The portion of the West Yard within NFS property would be subject to a VQO of modification. Development of a major rail staging West Yard in an open, prairie environment would change the character of the property to industrial use. The facilities would dominate the landscape and could significantly impact the visual qualities of the area. Mitigation techniques such as using local construction materials and painting the buildings to blend in with the natural surrounding could be required. This impact to the visual qualities of the area would be long-term, lasting the life time of the West Yard.

4.11.3 PRB EXTENSION - ALTERNATIVE D

4.11.3.1 New BNSF Interchange Yard

The BNSF Interchange Site location and impacts are the same as discussed for Alternative B.

4.11.3.2 Middle West Staging Yard

4.11.3.2.1 Location

The Middle West Staging Yard (Middle West Yard) would be located in Custer County, between mile posts 68.9 and 65.8. This segment of Alternative D would parallel the existing Chicago and Northwestern rail line. The Middle West Yard would begin north of Fairburn and end just south of the city. The Middle West Yard would be 300 feet wide and 3.1 miles long, with a total area of approximately 112.7 acres.

4.11.3.2.2 Geology and Soils

The proposed Middle West Yard site would cross soils that have a shallow bedrock layer and have low available water capacity. The impacts to soils would primarily be from conversion of the grassland to an industrial facility. Soils would be graded and covered with rail beds, gravel, concrete and asphalt. Runoff would occur during construction, increasing the potential for erosion. However, adherence to proper construction methods, such as mulching, would minimize these impacts. Impacts to soils would be short-term, and would stabilize after development of the Middle West Yard. During operations, the impact to soils would be primarily from run-off and erosion from the Middle West Yard.

4.11.3.2.3 Land Use

<u>Agriculture</u>

The Middle West Yard site would be primarily 112.7 acres of herbaceous grassland, and is used for livestock grazing. Conversion of this grassland to an industrial site would be a long-term impact. However, the impact of losing this grazing land would not be considered a significant impact, as grassland is abundant in the project area.

<u>Residential</u>

A portion of the Middle West Yard would affect a residential and developed area where the site intersects the town of Fairburn. Construction activities near residences would result in noise, dust, increased traffic and increases in emissions from construction. These impacts would be short-term, and would exist only during the construction activities at the Middle West Yard. However, permanent long-term impacts would result from the operations at the Middle West Yard.

Permanent impacts in residential areas would result from noise, emissions/dust and increased traffic. These impacts could be considered significant as they could disrupt residents living close to the Middle West Yard. However, the Middle West Yard would be located near an existing transportation corridor, and the residents would be accustomed to noise.

4.11.3.2.4 Water Resources

Surface Water

The Middle West Yard would cross one intermittent stream, a tributary to French Creek. This stream would require realignment or channelization. Impacts to surface water would include an increase in water velocity due to channelization and stream bank stabilization, scouring and erosion of streams and potential water quality issues associated with construction and operation of the Middle West Yard. Proper construction activities would minimize the potential for erosion. Safer rail operations and limited transportation of hazardous materials would prevent potential contamination impacts.

Wetland

No wetlands are located at the Middle West Yard.

Groundwater

Impacts to groundwater would be similar to what is discussed in Section 4.7.1.1.4.

4.11.3.2.5 Air

Construction and operation of the Middle West Yard would create air quality impacts similar to those described in Section 4.7.1.3.5.

4.11.3.2.6 Noise

The noise impacts from this yard would be similar to those discussed in Section 4.7.1.3.6.

4.11.3.2.7 Biological Resources

Vegetation

The Middle West Yard would cross mostly herbaceous grassland. Conversion of this plant community to an industrial facility would not result in significant impacts to project area vegetation, as this habitat is abundant in the area. In addition, riparian plant communities exist along the intermittent stream. Any degradation or loss of this plant community would be considered a significant impact. Riparian corridors are important habitat for regional wildlife and livestock. The construction activities would avoid these areas, which would prevent long-term impacts to this plant community.

Wildlife

Wildlife using habitat in the Middle West Yard have become habituated to activities associated with the existing rail line. However, short-term and long-term impacts would be anticipated during construction and operation of the Middle West Yard. Operational and construction impacts may include habitat loss, noise, train-wildlife collisions, increased human presence and the introduction of contaminants into the environment.

The loss of grassland habitat would result in wildlife being displaced. However, most species would be able to move to similar habitat in the project area. Small mammals, songbirds and reptiles could be displaced during initial development of the Middle West Yard; although, they could return when the site is stabilized and revegetated. Avoidance and protection of riparian zones would minimize disturbance of the wildlife utilizing stream corridors.

During operation, impacts to wildlife would be primarily due to disturbance from Middle West Yard activity. However, the level of activity and lack of habitat within the proposed Middle West Yard would likely result in most wildlife seeking more secluded habitat.

4.11.3.2.8 Transportation and Safety

The construction and operation of the Middle West Yard would impact streets and roads around Fairburn, resulting in alternate roads and bypasses being constructed. However, the exact location of facilities has not been determined and impacts to the transportation system would be difficult to determine at this time.

During operation of the Middle West Yard, increased traffic on project area roads would occur. Depending on the increased traffic volume, new control signs or lights could need to be designed to ensure road safety. It is expected that transportation impacts would be short-term, and would improve once the Middle West Yard is fully operational.

4.11.3.2.9 Socioeconomics

Approximately 20-30 jobs would be created at the start-up of Middle West Yard operations. However, once the Middle West Yard is fully operational, it is expected to create 40-50 permanent jobs. These job estimates only include direct railroad employees. Crew lodging and eating facilities would not be planned in the area, as it is expected that commercial facilities would be utilized. In addition, an increase in contract and support related jobs would be expected once the Middle West Yard is fully operational.

4.11.3.2.10 Hazardous Materials

The potential impacts resulting from hazardous materials would be similar to those discussed in Section 4.11.1.1.10.

4.11.3.2.11 Cultural Resources

The disturbance of cultural resources during the construction of the Middle West Yard would be likely due to the presence of a stream at the yard site. A survey of the proposed site would be required to determine if any cultural resource sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

4.11.3.3 West Staging and Marshaling Yard

4.11.3.3.1 Location

The West Staging and Marshaling Yard (West Yard) would be located in Crook County, and is southeast of Moorcroft. All facilities and West Yard operations would be located between mile post 563.0 and 568.0. The proposed West Yard would be 1,300 feet wide and 5 miles long, with a total area of approximately 787.9 acres.

4.11.3.3.2 Geology and Soils

The proposed West Yard site would cross soils that have a shallow bedrock layer and have low available water capacity. In addition, steep slope soils would be crossed that have a high potential for erosion. The soils at the West Yard would be disturbed during the construction phase, and could result in runoff and erosion. However, if proper erosion prevention measures would be incorporated, the degree of soil loss could be minimized. It is not known at this time how many facilities would be constructed at this site. Once a plan is developed for the West Yard, the impacts to soils would be easier to measure. During operations, the primary impact would be from run-off and erosion. This could increase erosion of adjacent soils unless proper drainage is provided.

4.11.3.3.3 Land Use

Agriculture

The development of the West Yard would affect approximately 175 acres of herbaceous grassland. Converting this site to an industrial facility would remove this land from grazing. However, the loss of this land would not be considered a significant impact as herbaceous grassland is abundant in the region.

BLM Lands

The proposed West Yard would parallel approximately one mile of BLM property.

The West Yard has the potential to impact BLM grazing allotments. If grazing allotments were reduced in size, the BLM would require mitigation to acquire the land needed to maintain the allotments. In addition, if cattle watering sites and trails were impacted by construction of the West Yard, mitigation would be required to maintain the needs of livestock.

4.11.3.3.4 Water Resources

Surface Water

The West Yard would cross approximately 13 intermittent streams. Impacts to these streams would be the same as discussed for the other yards.

Wetlands

There would be no wetlands located within the construction site for this yard.

Groundwater

The impacts to groundwater would be the same as discussed for the other yards.

4.11.3.3.5 Air

Impacts to air quality from the construction and operation of the West Yard under Alternative D would be similar to what is described in Section 4.11.1.2.6.

4.11.3.3.6 Noise

The impacts resulting from noise would be similar to what is discussed in Section 4.7.1.1.6.

4.11.3.3.7 Biological Resources

Vegetation

The vegetation at the West Yard is primarily herbaceous grassland. Riparian corridors are also present along the intermittent stream within the West Yards. Impacts to these plant communities would be the same as discussed for the other yards.

Big Game

The West Yard is used as yearlong range for pronghorn and mule deer. Impacts to big game would be the same as discussed for the other yards in Wyoming.

Non-Game Species

Impacts to non-game species would be similar to those discussed for the other yards.

Raptor

No raptor surveys have been completed for the proposed West Yard. It is assumed that raptors are using the riparian corridors along the intermittent streams. Raptors utilizing this habitat within the project area have been exposed to noise and disturbance from the Burlington Northern Rail Line that Alternative D is paralleling. This ensures that impacts to raptors would be minimal, as the additional disturbance would not displace birds utilizing habitat in the project area.

Sensitive, Threatened, and Endangered Species

No surveys of threatened and endangered species or black-tailed prairie dogs have been completed for the proposed West Yard. If prairie dogs are present at the West Yard, it is assumed that mountain plovers and swift fox may also inhabit the project area. Any impacts to these species would be considered significant, and would require mitigation.

4.11.3.3.8 Transportation and Safety

The West Yard would cross Buffalo Creek Road which intersects with Route 16 on the north side of the BNSF right-of-way. Once the location of facilities is finalized, the impacts to transportation will be easier to determine. However, the impacts to transportation would be the same as discussed for the other yards.

4.11.3.3.9 Socioeconomic

The West Yard would employ 100 employees at the start of operations. Once the West Yard would be fully operational, the facility is expected to employ 300 employees. The West Yard would be expected to be a major rail staging facility, and would include maintenance and minor repair units. In addition, an increase in support related jobs and contract jobs to support the West Yard would be likely. Additional lodging and eating facilities could become established near the proposed West Yard site to provide convenient services to railroad workers. The potential increase in jobs and businesses could also provide additional tax revenues to the communities in the surrounding areas and the county.

4.11.3.3.10 Hazardous Materials

The potential impacts from hazardous material would be similar to what is discussed in Section 4.11.1.1.10.

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4.11.3.3.11 Cultural Resources

The disturbance of cultural resources during the construction of the West Yard would be likely due to the number of streams that are located at the yard site. A survey of the proposed site would be required to determine if any cultural resource sites are present. Any sites identified would be addressed according to the Programmatic Agreement (Appendix J).

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